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Taking an occupational history:
its value in avoiding a misdiagnosis

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Abstract

Taking an occupational history is crucial for identifying an occupational disease, avoiding a misdiagnosis and directing the further medical and administrative management of a patient who also happens to be a worker. There are two components of an occupational history, a set of screening questions and a set of in-depth questions which can provide information on the occupational relatedness of a disease. Occupational presentations such as polymer fume fever and its consequences as presented in this paper can be missed in the absence of an occupational history. Reinforcing training in occupational history-taking teaching in undergraduate medical training programmes can contribute to improved diagnosis of occupational disease in clinical practice, and consequent improvements in the detection and reporting of occupational diseases.

Introduction

It is almost three hundred years since Bernardino Ramazzini first highlighted the importance of asking a patient about his occupation.[1] Understanding a patient's occupation and work-related exposures is today recognised as the cornerstone to identifying and diagnosing an occupational disease. In this paper we highlight the key elements of occupational histories and use a case study to discuss their value in avoiding a misdiagnosis.

In South Africa, with growing industrialisation, the health of working populations is of increasing concern. The number of cases of occupational diseases reported annually to the South African Department of Labour increased from 3361 to 5358, between 2001 and 2004.[2] Based on the experiences of occupational disease under-diagnosis and under-reporting in developed countries, where occupational medicine is well established,[3] and knowledge of the compensation system in South Africa, the numbers cited above for South Africa are probably a gross under-reflection of the true state of occupational diseases in the country. This is further suggested by a comparison of these figures, which represent a rate of approximately 0.04% (44.6 per 100 000), with a 1998 Health and Demographic survey that incorporated questions on work and health. In the latter, 2.6% of working respondents reported diseases related to work.[4]

Research from developed countries cite "a failure to recognise an occupational disease", "the length of time it takes for an occupational disease to develop following exposure" and "a worker's reluctance to report his illness for fear of getting into trouble or loosing his job" as reasons for the under-diagnosis and under-reporting of occupational diseases.[4-6] Failure to take an occupational history may be linked to the limited emphasis placed on the teaching of occupational health in undergraduate and postgraduate medical and nursing teaching programmes in these countries.[7]

In South Africa, occupational health is a Cinderella among medical specialities, with postgraduate occupational health training programmes developing only in the last ten years with support from international funding initiatives[8] and undergraduate occupational health training still receiving limited time in most medical faculties. As a result, the importance of taking an occupational history may not be sufficiently reinforced among young doctors and nurses.

In the public sector, a further barrier to the taking of an occupational history, or indeed of an adequate medical history, is the increasingly limited doctor/nurse-patient contact time as growing numbers of patients attend South African health services due to the impact of the human immunodeficiency virus epidemic.[9,10] With the need for rapid patient turnover most doctors and nurses are left "clearing a crowd" from their out-patient departments and primary health care clinics, with very little time given to taking an occupational history. Consequently, the work-relatedness of diseases may go unrecognised.

The migrant nature of South Africa's labour force can further obscure the link between occupational exposure and the presenting disease. Workers traditionally return to their rural homes when they retire or are retrenched, and on becoming ill seek treatment at a local clinic or hospital. Unless the attending doctor takes an occupational history the link between occupational exposure and the presenting disease is seldom made.

Taking an occupational history is important for the following reasons: (1) avoiding a misdiagnosis; (2)

" ... the key elements of an occupational history have to be taught and reinforced as part of ... training programmes ..."

avoiding unnecessary expensive and invasive procedures; (3) deciding on the further correct clinical management of the patient; and (4) assisting the patient in seeking compensation for his occupational disease. In addition, the diagnosis of an occupational disease should serve as a "sentinel event", and provide an opportunity for disease prevention among co-workers and similarly exposed workers elsewhere.

Parts of an occupational history

The occupational history should comprise two parts.

(1) Ask a series of initial questions on consultation, to identify the possibility of an occupational relation to the worker's disease presentation. They serve as a set of screening questions and provide details on the job with respect to duration, exposures and the relation of symptoms to the job.[1,11,12]

(2) If the worker's responses to the initial screening questions suggest that his symptoms may be work-related, ask a series of more detailed questions which confirm or refute an occupational relation to the patient's disease presentation. These questions should include a detailed current and past employment history. He should give a description of the work he was required to perform and the processes involved in each job. Often the job title does not provide sufficient information on the tasks required of each job, and deeper probing will be required to obtain a clear understanding of the job tasks and work processes,[1,11,12] as well as the exposures that the worker experienced in each job. The worker may experience different exposures at different times in a working day or as work processes change in a working week, month or year and between different jobs or tasks.

Having established sufficient details about the worker's employment history and work exposure, the doctor should question the worker in greater detail about the work-relatedness of his symptoms with respect to each of his jobs. Having said this, it is not uncommon for a worker to be exposed to a causative agent in one job and to present with symptoms years later when either in another job or retired. In diseases such as silicosis and asbestosis, exposure to the causative agent may have taken place twenty years prior to the presentation of symptoms and signs of the disease.

Ask the worker about the provision of personal protective equipment (PPE) during each job.[1,11,12] The type of PPE provided, the circumstances in which it was used and the frequency with which the worker was allowed to change it are important factors to note. Also note whether the use of PPE improved or aggravated presenting symptoms in the worker. This information may be important in further management. For example, respiratory symptoms can make the wearing of any kind of respirator uncomfortable, and reliance on this form of control to prevent further exposure will be impracticable.

Find out details about the presence of co-workers with similar symptoms to the worker in either his current or previous jobs.[1,11,12] In cases where workers have retired or have lost contact with colleagues from previous jobs, gathering information on illness in other workers may prove difficult.

Question the worker about social habits, such as smoking and alcohol consumption which can cause illness in workers and which may aggravate occupational diseases.[1,11,12] Hobbies which can predispose to illness[1,11,12] and lead to either a misdiagnosis of, or aggravate, an occupational disease should be identified.

Case study

The following is a case study of Mr DA, a 43-year-old man who had been retrenched from work, and who presented at a tertiary occupational medicine clinic.

His medical management history prior to attending at the occupational medicine clinic was as follows:

2001 – He had first presented to his general practitioner with a single episode of "bringing up" blood. He was referred to a private surgeon who performed an endoscopy and liver biopsy. The endoscopy was normal and the liver biopsy suggested that he may have chemically-induced hepatitis.

2004 – He was admitted to hospital for haemoptysis, which resolved and was not investigated further.

2005 – He was admitted to hospital for haemoptysis and was assessed by cardiothoracic surgeons. A chest X-ray showed minor inflammatory changes in the mid zone of his right lung field. A high resolution CT scan and CT-angiography were performed to exclude a pulmonary-arteriovenous malformation and returned normal results. A consultation by an ear nose and throat surgeon found no abnormality.

2006 – He was referred to respiratory physicians who performed a bronchoscopy, again with no findings of any abnormality. Lung function testing (flow-volume loop) showed a change of 9% on FEV1 following bronchodilator therapy. On the basis of this, a provisional diagnosis of occupational asthma was made, and the patient was referred to the occupational medicine physicians for further investigation and completion of compensation forms.

When he first presented to his general practitioner, he should have been asked the series of initial screening questions that appear in Box 1.

Box 1. Initial screening questions that the patient should have been asked[1,11,12]

1. What are your symptoms?
2. What is your job?
3. How long have you been employed in your current job?
4. What are you exposed to at work?
5. What is the work process?
6. Were your symptoms worse at work? Did they get worse at home?

These questions would have elicited the following information:

Mr DA complained of having a fever and chills with an associated cough and a tight chest and 3 episodes of haemoptysis at work. He had worked for 18 years as a plant supervisor at a company, in which protective coatings made of polytetrafluorethylene (Teflon) were applied to various items including cooking utensils. He supervised a process in which baking pans received from bakeries were reconditioned at 500°C to remove the remnants of the existing Teflon coatings, were then re-sprayed with Teflon and baked at 385°C. These symptoms occurred only when he was working; not over weekends nor during holidays.

Having been alerted to his exposure to polytetrafluorethylene, and therefore the possible work-relatedness of his symptoms, the doctor should then have asked further questions about his work (see Box 2).

Box 2. Further questions to ask the patient about his occupational history[1,11,12]

1. How many jobs have you held in your lifetime?
2. For each job which you held can you tell me the following:
   a. Job title?
   b. The duration of each job you held?
   c. The nature of the work processes and the exposures of each job?
   d. Were you provided with personal protective equipment (PPE), the type of PPE provided and how frequently was it changed?

These questions provided the following details:

The patient had three previous jobs; a maintenance worker in a diary, a wood machinist in an upholstery company and an officer manager in a stationery company. The two former jobs were for four years each and the latter for one year. The only occupational exposure of note was that of wood dust, but the patient was asymptomatic through these years.

This information would have led the doctor to disregard other occupational exposures and to focus on the one involving polytetrafluorethylene exposure. Additional information could then have been obtained by asking the questions shown in Box 3.

Box 3. Further questions to ask the patient about the work-relatedness of his symptoms[1,11,12]

1. When did your symptoms start in relation to your job?
2. Did they start in your current job or in a previous job?
3. Did they deteriorate or improve in the working day or week?
4. Were there particular changes in the work process, which caused exacerbations?
5. Are you provided with PPE, what type of PPE was provided and how frequently was it changed?
6. Were/are there other workers, at your current or previous workplace, with similar symptoms?

The information from these questions is provided below:

He gave a 12-year history of multiple episodes of the above-mentioned symptoms which started toward the end of the working day and resolved by 2 am. He sought medical treatment from general practitioners and was treated for influenza on each occasion. However, the symptoms persisted. On three occasions between 2001 and 2005 he was admitted to hospitals with episodes of haemoptysis. These episodes followed periods of continuous work for two weeks (including overtime) re-conditioning baking pans at 500°C. The worker was provided with a double filter respirator mask and workers were expected to change

when they could smell the fumes. There were no other workers with similar symptoms.

At this stage, the doctor would have obtained sufficient information to suspect that this patient had experienced episodes of polymer fume fever (PFF). This is one of the "inhalation fevers", clinical syndromes that follow shortly after exposure to the causative agents after which they are usually named. Other inhalation fevers include metal fume fever, humidifier fever and organic toxic dust syndrome.[13] In inhalation fevers, the lung is both the portal of entry and the target organ, and produces biochemical inflammatory mediators that result in a (usually polymorphonuclear predominant) alveolitis. Interleukins 1, 6 and 8, and tumour necrosis factor, appear to be important in the pathophysiology of these conditions. Most inhalation fevers resolve without sequelae, but recurrent attacks of PFF have been reported to result in pulmonary fibrosis. Acute lung damage and pulmonary oedema have also been reported as sequelae of polymer fume fever.[13]

Inhaled polytetrafluorethylene (Teflon) pyrrolysis products have been associated with polymer fume fever.[14,15] Classically, symptoms develop at the end of the working day and include chest pain or tightness, malaise, fever, chills sweats, nausea and a sore throat. Symptoms may initially be debilitating but usually resolve in 12 to 48 hours and investigations are usually unremarkable.

This patient was exposed to polytetrafluorethylene pyrrolysis products as a result of the reconditioning and baking process and had experienced all the classic symptoms of PFF. In addition, the findings of the diagnostic tests had been unremarkable.

To complete the history, the doctor should have asked about his childhood history and social habits, which could have caused or aggravated his condition (see Box 4).

Box 4. Additional non-work-related questions to ask the patient [1,11,12]

1. Did he have a childhood history of note?
2. Smoking: what, how many per day, duration?
3. Alcohol consumption: what, how much, duration?
4. Hobbies: activities and exposures?

In this case, Mr DA reported the following:

He had a cardiac murmur diagnosed at age three which did not require any treatment and resolved by age 12. He had smoked approximately 8 cigarettes per day for 25 years. He smoked regularly while at work. He consumed alcohol socially and had no hobbies.

His smoking history was important as workers exposed to polytetrafluorethylene pyrrolysis products, who also smoke cigarettes, appear to be particularly at risk for PFF.[16-18]

The clinical examination was unremarkable and a review of a series of existing lung function tests showed a mild restrictive lung disease pattern. No further investigations were requested.

A final diagnosis of a chronic restrictive occupational lung disease following multiple episodes of polymer fume fever was made. The patient was advised about his condition and a claim for compensation of an occupational lung disease was submitted to the Compensation Commissioner for consideration. Since the patient was retrenched he was no longer exposed to

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Teflon and no other episodes of PFF or haemoptysis have been reported.

Discussion

In this case, the diagnosis was missed on more than one occasion, with implications for the patient with respect to his medical management and, possibly, long-term health outcomes. If a good occupational history had been obtained, a correct diagnosis could have been made soon after the first episode.

Failure to obtain an occupational history is not uncommon. In a 2002 review of 2050 patient charts at a health care facility in south-western Pennsylvania, USA, only 27.8% of records contained some indication of occupational history.[19] A second study conducted at the US Department of Veterans Affairs Palo Alto Health Care System between 1999 and 2002, found that 75% (n=147) of 197 asthmatics had their occupational status documented. However, descriptions of specific work duties were identified in only 5% (n=9) of workers and documentation of potentially significant respiratory exposures at work were found in 11% (n=21) of cases.[20]

The burden of occupational disease in South African primary health care facilities is unknown, but research conducted in several health facilities in Los Angeles, USA, in 2001 found that 39% of participating patients felt that their illness was caused by their occupations.[21] This stresses the importance of general medical practitioners and nurse practioners being trained in, and taking, an occupational history in order not to miss possible occupational diseases at a primary health care level.

Conclusion

A detailed occupational history will either exclude an occupational disease or will provide sufficient information for the doctor to proceed further with medical and workplace investigations to confirm an occupational disease. However, the key elements of an occupational history have to be taught and reinforced as part of undergraduate and postgraduate medical and nursing training programmes, if doctors and nurses are to implement it as a tool in successfully diagnosing occupational disease in practice.

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