

A CASE REPORT OF OCCUPATIONAL MIDDLE EAR TUBERCULOSIS IN A NURSE

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This article presents a case of a 40-year-old female patient with a right-side middle ear tuberculosis. The patient was a nurse, who had worked at the Department of Pulmology, Clinical Hospital Rijeka for 17 years. The cause was infection with *Mycobacterium tuberculosis* while she assisted in bronchoscopy. The patient was referred to occupational medicine (OM) for confirmation of occupational disease immediately after surgery. The disease was confirmed as occupational by the Croatian Institute for Health Insurance of Health Protection at Work.

During surgery a sample was taken for microbiological analysis. We did initial and control multislice computed tomography (MSCT) and control magnetic resonance imaging (MRI) of temporal bones 6 months after the surgery. The initial MSCT showed total mastoid cell shadowing without destruction, while the control image showed almost full recovery save for a few remaining shadowed cells. Adequately taken occupational history by an OM specialist can significantly shorten the time to diagnosis of a rare occupational illness that is often manifested by non-specific symptoms.

KEY WORDS: *extrapulmonary tuberculosis, healthcare workers, occupational disease, occupational medicine*

Traditional risk factors of extrapulmonary tuberculosis (ETB) include immigration, poverty, immunodeficiency, and drug addiction. ETB mostly affects young people and is slightly prevalent in women (1). The number of its localisations is on the rise (2). In 95 % of the cases, tuberculosis (TB) of the head and neck is manifested as cervical lymphadenopathy (3). Middle ear TB is rare (4). A very rare case of bilateral tuberculous mastoiditis has been described in an immunocompetent person (5) and of unilateral middle ear TB in a patient with a malignant disease (6). It is hard to diagnose because microbiological, histomorphological, and cytological analysis are not readily available (7). The diagnosis is difficult even when the disease affects other structures of the skull and lungs (8). Some find middle ear TB a secondary bloodborne disease, as most patients

had active lung TB (9). Symptoms are not specific (10). Some patients show facial nerve paralysis and labyrinthitis (11). Diagnosis is often made at surgery, after bacteriological analysis of removed tissue (12). The outcome of middle ear TB can be a persistent hearing loss (13).

Otitis media in occupationally exposed staff non-responsive to routine therapy should arouse suspicion of occupational ETB. This article presents one such case.

CASE REPORT

Our patient is a 40-year-old female nurse, who had worked at the Pulmology Department of the Clinical Hospital Rijeka for 17 years. Symptoms

were unspecific and included tinnitus and a feeling of swelling inside the right ear. The patient developed a perforation on the anterior and lower part of the tympanic membrane. She had no history of treatment for acute or chronic otitis or mechanical ear injury. In addition, she had no history of any kind of chronic diseases or immunodeficiency. Ear problem persisted and aggravated with time, and the patient took sick leave in November 2008. The sick leave was approved by a general practitioner with the diagnosis chronic otitis media. In May 2009 she was admitted to the Otolaryngology Clinic of the Clinical Hospital Rijeka. She underwent surgical drainage, and a sample was taken for bacteriological test. For primary isolation of mycobacteria, we inoculated a Bactec MGIT 960 liquid medium and a Löwenstein-Jensen slant (Becton Dickinson Microbiology Systems, USA). According to the 16 June 2009 report, the microbiological finding turned out positive for *Mycobacterium tuberculosis*. As the patient was occupationally exposed to *Mycobacterium tuberculosis* during bronchoscopy procedure, the disease was defined as occupational and further care referred to a specialist in occupational medicine.

Pulmonary X-ray and microbiological analysis of the sputum excluded pulmonary TB. As soon as the microbiological findings were available, the patient received specific therapy including etambutol, pyrazinamide, rifampicin, and a combination of isoniazid and pyridoxine, which lasted two months. Then she continued to take rifampicin and isoniazid+pyridoxine for ten months.

The initial multislice computed tomography (MSCT) (Siemens Somatom Sensation, Germany) of the right mastoid and tympanic cavity was done in May 2009, and control MSCT and magnetic resonance imaging (MRI) (Siemens Magnetom Avanto 1.5T, Germany) were done in December 2009. The initial MSCT showed total shadowing of mastoid cells on the right-side temporal bone without signs of destruction. Right middle ear cavity was totally filled with liquid indicating inflammatory exudation (Figure 1). The control MSCT showed almost complete recovery with only a few shadowed cells remaining and no bone destruction (Figure 2).

The MRI series of axial and longitudinal sections showed normal shape of the inner, middle, and external ear on both sides. Flair and T2 signal showed inflammation of a few mastoid cells of the right ear.

We do not have the results of the initial audiometry made at the Clinical Hospital in May 2009, but



Figure 1 The initial axial CT scan through the right-side temporal bone shows total shadowing of the mastoid process and tympanic cavity

control audiometry made at Occupational Medicine Department of the Health Centre in Rijeka in December 2009 and in April 2010 showed regular hearing threshold at 20 dB for all frequencies in the left ear. Right-ear audiometry performed in December 2009 showed combined sensorineural and bone damage, and hearing threshold at 60 dB for 250 Hz and 500 Hz, at 40 dB for 1 kHz, at 30 dB for 2 kHz,



Figure 2 The control axial CT scan through the right-side temporal bone shows normal mastoid process and tympanic cavity

and 20 dB for 3 kHz and 4 kHz. The last control audiometry of the right ear performed in April 2010 confirmed combined sensorineural and bone damage and hearing threshold at 60 dB for 250 Hz, 65 dB for 500 Hz, 40 dB for 1 kHz, 25 dB for 2 kHz, and 20 dB for 3 kHz and 4 kHz.

DISCUSSION

This case is important because it is a rare disease, especially in an occupational setting. According to Croatian law, treatment of occupational diseases and sick leave are fully covered, but the diagnosis by occupational physician has to be confirmed by a relevant authority, in this case the Croatian Institute for Health Insurance of Health Protection at Work. Sens et al. (14), however, express doubts about claiming a disease occupational, as certain categories of patients such as children and the unemployed preclude occupational exposure. Assessment should therefore be limited to the occupationally exposed population such as medical practitioners and healthcare workers who get ill (15). Professionals at risk should undergo periodical tests such as annual tuberculin test (16). Suzuki and Satou (17) have shown that nurses run a 4.3 times higher risk of TB infection than general population of the same age. This does not mean that preventive measures are not to be carried out in other industry branches.

In our patient, *Mycobacterium tuberculosis* found a rare entrance, most probably through the sinus over the Eustachian tube to the middle ear. We believe that she was infected while assisting a physician perform bronchoscopy in a patient affected by TB. Earlier Kim et al. (18) described a rare case of middle ear TB as a complication of tympanostomy tube insertion. The perforation on the anterior and lower part of the tympanic membrane in our patient corresponds to cases described in literature (19).

The acute phase is now over. It is still necessary for our patient to take tuberculostatics for some time until complete healing. After that, the otolaryngologist will decide if it is necessary to reconstruct the tympanic membrane (20).

The patient is expected to recover and return to work soon. However, the consequence will be a significant loss of hearing at lower frequencies, as confirmed by the last audiometry in April 2010. This damage can be permanent. Before TB infection the patient was completely healthy, with no acute or chronic illness or immunodeficiency.

Medical practitioners should take tuberculosis into consideration whenever there is a chronic disease with long-term duration. This is supported by a recent paper by Knežević et al. (21), who found that chronic skin inflammation was caused by tuberculosis infection. Tuberculosis is an infectious disease, and apart from the need to protect the patient, there is a need to protect persons who come in contact with the patient.

Since its establishment on 1 January 2008, Croatian Institute for Health Insurance of Health Protection at Work has achieved good results in diagnosing professional diseases and work injuries (22). Occupational medicine in Croatia more than halved the loss of days due to work-related injuries and illnesses. This has streamlined the procedure for patients such as our nurse (23) and has placed Croatia with other modern OM services such as Brazil or the UK.

Acknowledgement

This report has been approved by the University of Rijeka School of Medicine Ethics Committee. The patient has consented to the publication of this report in a scientific journal, including all relevant data.

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Sažetak

PROFESIONALNA TUBERKULOZA SREDNJEG UHA U MEDICINSKE SESTRE: PRIKAZ SLUČAJA

Tuberkuloza srednjeg uha kao primarna bolest je rijetka. U ovom radu prikazana je 40-godišnja pacijentica, medicinska sestra, koja je radila 17 godina na Odjelu za pulmologiju Kliničkoga bolničkog centra u Rijeci, u Hrvatskoj, i oboljela je od desnostrane tuberkulozne upale srednjeg uha. Razlog je bio kontakt s *Mycobacterium tuberculosis* za vrijeme asistiranja kod bronhoskopije. Cilj je rada upozoravanje na važnost medicine rada koja je odmah nakon primitka pacijentice započela proces priznavanja profesionalne bolesti. Nakon dobivanja suglasnosti Hrvatskog zavoda za zdravstveno osiguranje zaštite zdravlja na radu pacijentica je dobila status profesionalno oboljele osobe i sva prava koja joj iz toga proizlaze. Za vrijeme operacije srednjeg uha uzet je obrisak na mikrobiološku analizu. Učinjena je inicijalna i kontrolna višeslojna kompjutorizirana tomografija (MSCT) te magnetska rezonancija (MR) temporalnih kostiju nakon 6 mjeseci liječenja. Mikrobiološka analiza bila je pozitivna na *M. tuberculosis*. Inicijalni MSCT pokazao je potpuno zasjenjenje celula mastoida bez destrukcije, a kontrolna snimka gotovo potpunu sanaciju sa zasjenjenjem tek pokoje celule, dok MR pokazuje porast signala kod malobrojnih celula. Dobro uzeta radna anamneza od strane medicine rada može znatno skratiti vrijeme dijagnosticiranja rijetkih profesionalnih bolesti, koje često imaju nespecifične simptome. Nadalje, pokretanje postupka te priznavanje profesionalne bolesti značajno je za adekvatni status i liječenje osoba oboljelih na radu.

KLJUČNE RIJEČI: *ekstrapulmonalna tuberkuloza, medicina rada, profesionalna bolest, zdravstveni radnici*

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