Mycobacterium smegmatis Infection in a Thai Woman

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Abstract

A patient presenting with an ulcerated tumour mass over the right orbit was proven to be a case of M. smegmatis infection involving the orbital contents and surrounding structures, regional lymph nodes and possibly both lungs. Following exenteration of the right orbit and the institution of anti-mycobacterial chemotherapy, the patient's general condition and all lesions improved. (J Infect Dis Antimicrob Agents 1993; 10:25-28)

Key words: Mycobacterium smegmatis

Mycobacterium smegmatis is a rapidly growing environmental species, closely resembling M. fortuitum, but usually considered not a human pathogen (1,2). To the best of our knowledge, at the time of writing, there had been only three previous reports of human disease in a total of 24 patients. Vonmoos et al (3) were the first group to describe, in 1986, a case of pleuro-pulmonary infection complicating exogenous lipid pneumonia in a laryngectomy patient. Wallace et al (2) reported in 1988 from their collection of 21 patients, in most of whom the organisms were isolated from skin or soft-tissue infections. More recently (1991), Plaus and Hermann documented two patients whose infection occurred from self-injection with a veterinary-grade anabolic steroid. In this report, we describe another case of human infection, hitherto not encountered in Thailand.

THE PATIENT

A 50-year-old female Thai farmer was admitted to the Ophthalmological Ward on February 25, 1992 (HN. 033339-35; AN. 1-7831-35) for the planned exenteration of the right orbit. Her present illness probably started more than two months previously when her right eye was accidentally slashed by a rice-leaf for which she received treatment (with apparent cure) at a provincial hospital. A month later a pustule appeared over the right eye-lid, which subsequently broke out to form an ulcer and grew to be a large ulcerated mass despite treatment with antibiotics.

Physical examination on admission revealed a sthenic woman in no acute distress. Other findings

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Received for publication: August 5, 1992
were not remarkable, apart from the presence of a slightly tender ulcerated mass (3x6 cm) covered with serosanguinous discharge over the right upper eye-lid (Fig. 1) together with tender right preauricular lymph nodes (1x2 cm) and right submandibular lymph nodes (3x4 cm). Vital signs were: body temperature 36.3°C, pulse rate 70/minute, respiration rate 20/minute, and blood pressure 120/80 mmHg. Routine laboratory investigations showed haemoglobin concentration to be 11.0 g/dl, haematocrit 35 per cent, white blood cell count 8,900/mm³, with 57 per cent neutrophils, 20 per cent lymphocytes, 1 per cent eosinophils and 6 per cent monocytes; red blood cells and platelets were adequate in number and normal in appearance. Other relevant laboratory findings were: fasting blood sugar 92 mg/dl, blood urea nitrogen 8 mg/dl, serum bilirubin (direct) 0.2 mg/dl, aspartate aminotransferase 98 U/l (normal 0-37 U/l), alanine aminotransferase 125 U/l (normal 0-40 U/l), alkaline phosphatase 247 U/l (normal 39-117 U/l), and gamma-glutamyl transferase 277 U/l (normal 7-50 U/l). The test for human immunodeficiency virus (HIV) antibody was negative. A chest radiograph taken on the day of admission revealed no definite abnormal shadows (Fig. 2). Skull x-rays showed cloudiness over the right orbit due to a superimposing soft tissue mass and a soft tissue shadow inside the right maxillary sinus.

**Fig. 1** Picture of the patient's face showing a large ulcerated tumour mass over the right orbit.

**Fig. 2** Chest radiograph on admission showing no abnormal findings.

**Fig. 3** X-ray picture of patient's skull showing clouding over the right orbit and a soft tissue shadow in the right maxillary paranasal air sinus.

**Fig. 4** Computed tomographic scan of the right orbit showing soft tissue shadow occupying the areas of retrobulbar space, eye-lid and paratemporal fossa, with surrounding bone destruction, and invasion of paranasal air sinuses.
Fig. 5 Histological picture of biopsied tissue from the orbital mass showing acute as well as chronic inflammation with acid-fast bacilli present.

(Fig. 3). Computed tomographic scanning of the right orbit (March 18, 1992) visualized a large soft tissue mass occupying the retrobulbar space, the eye-lid and paratemporal fossa, and surrounding bony destruction with invasion of paranasal air sinuses (Fig. 4). Evaluation of the patient's immunological status showed normal T-cell subpopulations and T-cell function.

Biopsied tissue from the eye-lid mass (March 24, 1992) yielded no microorganisms on direct smear and stainings, but the histological examination showed pictures of mixed acute and chronic inflammation with the presence of acid-fast bacilli (Fig. 5); three days later, culture of the biopsied tissue grew several non-pigmented mycobacterial colonies harbouring microorganisms with characteristic properties (negative three-day arylsulfatase reaction, growth on McConkey agar without crystal violet at 28°C, reduced nitrate but positive iron uptake at 28°C, using mannitol as the sole carbon source) consistent with the reference strain of *Mycobacterium smegmatis* ATCC 35798 from the Trudeau mycobacterial culture collection.

Anti-mycobacterial treatment was started on April 2, 1992 with amilacin (500 mg/day intramuscularly), ethambutol (800 mg/day orally), and ofloxacin (600 mg/day orally). Ofloxacin was replaced by doxycycline (200 mg/day orally) 10 days later when the result of drug sensitivity test was known.

The patient was transferred to the Medical Ward on April 16, 1992 following a marked deterioration of her general condition; she became febrile with stiffness of the neck. Clinical assessment confirmed the presence of meningeal irritation but the lumbar puncture did not support the diagnosis of acute meningitis. Although the initial chest radiograph taken on admission showed no abnormality, the one taken on April 14, 1992, revealed definite abnormal changes in both lungs, more extensive on the right side (Fig. 6). Owing to the non-production of sputum, no sputum examination was made. Exenteration of the right eye was performed on April 27, 1992. At operation it was revealed that almost all of the orbital tissue was caseously necrosed and the wall of the ethmoidal sinus was partly destroyed; histological examination again revealed acute inflammatory and granulomatous lesions, but without acid-fast bacilli being demonstrated. Thereafter, with full supportive treatment given and the anti-mycobacterial drugs continued, the patient's general condition and the orbital wound gradually improved. Follow-up chest radiographs showed gradual clearing of the abnormal shadows, with almost complete resolution on the most
recent one (July 20, 92) (Fig. 7). The cervical lymph nodes decreased in size and were not tender; the liver function profile also improved (SGOT 27 U/l, SGPT 30 U/l, GGT 49 U/l). Amikacin was discontinued on May 4, 1992. Ethambutol and doxycycline were to be continued up to the end period of a nine-month course.

**DISCUSSION**

Up to the year 1986 when the first case was reported (3), *Mycobacterium smegmatis* was considered not pathogenic to man. It is now evident that human diseases due to this environmental mycobacterium do exist or have existed longer than was known. The reason for this late recognition of its existence has been attributed to confusion *M. smegmatis* with *M. fortuitum* because both are rapid growers and resemble each other biochemically except that the former produces a negative three-day arylsulfatase test, a low semi-quantitative catalase test, and grows at 45°C.

To the best of our knowledge, following a recent review (5), the present patient is the first case of *M. smegmatis* infection to be documented in this country, and could well be the first case in the world literature of an orbital *M. smegmatis* infection spreading via lymphatics to regional lymph nodes and subsequently disseminated haematogenously to the lungs. Unfortu-nately, we could not be certain that *M. smegmatis* was the cause of the lung infection owing to the inevitable lack of microbiological confirmation, even though the lung lesions responded so dramatically to the treatment. Meningeal irritation without menigitis developed as a local reaction to invasion of the surrounding tissue close to the meninges. As is well known, the sources of this mycobacterium are environmental; it is naturally present in the soil and sewage (6). Our patient acquired her infection from an accidental injury in a rice field.

**SUMMARY**

A case of human infection by *Mycobacterium smegmatis* is reported herewith for the first time in Thailand and tenably the first case of orbital infection ever documented in the literature. The patient was a 50-year-old woman whose right eye was accidentally injured by a rice leaf. Subsequently she was infected with *M. smegmatis* which infected the whole orbital tissue including the bony part. The infection spreaded to the regional lymph nodes and most possibly to both lungs. Improvement towards recovery was attributed to treatment with ethambutol and doxycycline.

**REFERENCES**