

RESEARCH NOTE

Buruli Ulcer in Ghana

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Buruli ulcer (BU) was first described in 1897 in the present territory of Uganda and *Mycobacterium ulcerans* was first reported to be the etiologic agent by Mac Callum in 1948, in Australia (P Mac Callum et al. 1948 *J Pathol Bacteriol* 60: 93-122). So far has been described in several tropical and subtropical countries (WM Meyers et al. 1974 *Am J Trop Med Hyg* 23: 919-923). The disease is defined as an ulcer with undermined borders, necrosis of the underlying subcutaneous tissue and a shiny hyperpigmented skin surrounding the ulcer (TS van der Werf et al. 1987 *Trans R Soc Trop Med Hyg* 83: 410-413). Muelder describes four clinical stages: nodule, necrotizing panniculitis, ulcer and scar (K Muelder et al. 1992 *Int J Dermatol* 1: 25-26).

Although the disease was reported in Ghana in 1971 (AC Bayley 1971 *Br Med J* 2: 401-402), the first case was diagnosed in 1969 according to Ghanaian health care officials. Since then, the BU has extended to other regions of the country such as the Amansie West District where 90 cases were reported (GK Amofah et al. 1991 *Trans R Soc Trop Med Hyg* 87: 644-645).

In December 1993, a multidisciplinary task force from the Tropical Medicine Institute "Pedro Kourí" (IPK) of Cuba, began a research project in the Amansie West District (Tontokrom), Ghana. This study was carried out in a sylvan area, where there's no health care unit; there is only a place called "dressing house", where personnel are trained for healing people. This was the first time that specialized medical care was offered in Tontokrom.

A total of 105 patients with BU were studied. The clinical description was established by categorizing the different clinical stages of the disease (Muelder et al. *loc. cit.*). Each patient was examined by a clinician and a dermatologist.

A questionnaire was completed for each patient collecting data regarding age, sex, living conditions, time elapsed since the appearance of the first symptoms, occupation and other questions of any clinic-epidemiologic interest (A Llop et al. 1994 *Rev Cubana Med Trop* 46: 120-126).

Informed consent was obtained from 15 patients, who had an open ulcer or a suspicious lump. Blood samples were taken from each of these patients. Fine needle aspiration and skin biopsy samples for microbiologic and histologic studies were also done.

All the samples were sent to the Microbiologic Laboratory at IPK in Havana, Cuba, for isolation of *M. ulcerans* and to exclude the presence of any other microorganisms. Blood smears were examined for parasites and serum samples were tested for HIV by ELISA.

We were unable to isolate *M. ulcerans* from any of the specimens obtained, instead all of the cultures grew other organisms, 73.33% *Enterobacteria* (*Proteus*, *Enterobacter* and *Citrobacter*) and in 26.6% grew *Pseudomonas* spp. No fungal growth was observed.

Using the Zielh-Neelsen staining method a large number of acid-fast bacilli (AFB) was obtained from the swab of the ulcer of one patient. However, no mycobacterial growth was observed in Lowenstein-Jensen medium and Middlebrook 7H9 at 32°C for the 12 weeks. The reference strain (*M. ulcerans* ATCC 19 423) from IPK collection was used as positive control. One patient was HIV-1 seropositive (6.66%). *Plasmodium falciparum* was found by Giemsa staining in five patients (33.33%).

The histologic findings of 14 (93%) samples corresponded to chronic skin ulcers. Epithelial hyperplasia at the ulcer edges, granulomatous tissue under the skin overlaps, and fibrosis of the subcutis under the ulcers bottoms were found in every sample. A diffuse chronic inflammatory infiltrate was observed at the bottom of the ulcers. Giant cells epithelioid granulomas were evident at the periphery of the ulcer in the samples of two different patients. Another patient had a large ulcer with a cotton-like tissue at the bottom of the ulcer on the right scapula area. Histologically, this tissue corresponded to necrotic adipous and fibrous tissue with clouds of AFB.

There are many factors contributing to the difficulties encountered upon culturing *M. ulcerans*. They are not easy to isolate due to their slow growth, sometimes as long as 12 weeks (PT Kent et al. 1985 *Public Health Mycobacteriology: A guide for the Level III Laboratory*. Atlanta, Center

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for Disease Control, PHS, USDHHS, 207 pp.). However we believe that the most likely cause was the long clinical evolution of the ulcers (from 4 months to 7 years). According to patient's information, the survey showed that all patients have received some local or systemic treatment, and they were not able to determine with precision which drug was used.

Another factor which might have been associated was the delay between samples' acquisition and processing (10 days), what could explain the fact that in the patient with the positive bacilloscopy there was no growth of *M. ulcerans*. Our results are similar to previous studies, being unable to grow *M. ulcerans* from BU patients (BJ Marston et al. 1995 *Am Soc Trop Med Hyg* 52: 219-223); instead, a large number of bacterial growth causing secondary infections was found (Amofah et al. *loc. cit.*). In a study made by Van der Werf in West Africa, *M. ulcerans* was isolated in 5 of 26 biopsies of BU patients, probably due to the short evolution of the dis-

ease (TS van der Werf et al. 1990 *Lancet* 8: 1440).

In relation to the finding of HIV-1 and *P. falciparum*, they are the most frequent pathogenic agents in this region, although there is few information about the relationship between BU and these agents, three co-infected patients with BU and HIV infection were reported in Zaire (S Allen 1992 *Int J Dermatol* 31: 744-745).

BU has become a major health problem; not only for Ghana but also for West Africa. So it is necessary to implement urgent effective therapeutic measures and to perform investigations to identify environmental reservoirs of *M. ulcerans*. It is also important to state the predisposition factors for acquiring this disease and to avoid sequelae that threatens the current and future economy of the affected, the family and the community.

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