

Mycobacterial Diseases

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Rapid Assessment Survey of The Prevalence of Buruli Ulcer in The Health District of South Maniema, Maniema Province, The Democratic Republic of The Congo

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Abstract

Background: Buruli ulcer (BU) is endemic in more than 30 countries worldwide. Africa is the most affected continent with 16 confirmed endemic countries and 7 suspected or potential endemic countries. In the Democratic Republic of the Congo, a survey in 2004 showed the presence of suspected cases of BU in five of the country's 11 provinces. The current survey was carried out in 2010 to confirm the endemicity of BU is the southern part of the Maniema Province and to provide support for case management and control measures if necessary.

Method: The method of the survey was based on the protocol of rapid prevalence assessment survey (RPAS), proposed by the Buruli ulcer control Program of the World Health Organization (WHO) Regional Office for Africa to confirm BU endemic in countries. It included: awareness campaign and sensitization of health workers and communities in suspected endemic areas, followed by clinical screening of patients with suspected BU lesions and sampling of suspicious lesions by swab or fine needle aspiration (FNA) for laboratory confirmation of diagnosis, mainly by PCR. WHO-recommended treatment is proposed for cases which clinical features were in favor of the diagnosis of Buruli ulcer.

Results: The survey in the Southern part of Maniema province targeted six of the nine health zones of Kasongo district. The three other health zones in the district were not be visited for accessibility and security reasons. A total of 66 suspected cases of Buruli ulcer were found at the Hospital of Kindu and in the six visited health zones. The lab tests with Ziehl-Nielsen (ZN) technique have confirmed 9 cases of BU. PCR tests confirmed eight cases of BU, including three who were not positive to the ZN tests. This makes a total of 12 BU patients confirmed by ZN and/or PCR and gives a proportion of laboratory confirmation of 18%.

Discussions: Based on the results of this survey all health zones in South Maniema were classified as Buruli ulcer endemic areas, because of the same geo-climatic features that characterize all of them. These findings are similar to those of previous studies in the same province. The low confirmation rate of BU suspected cases by laboratory tests (18%) could be explained by the fact that many of the suspicious lesions which were sampled were very old wounds and had been evolving for several years. The WHO Regional Office for Africa has developed a plan of surveys, using the same rapid assessment protocol to confirm the endemicity of Buruli ulcer in other suspected endemic provinces of the DRC and in other member states of WHO African Region.

Keywords: Buruli ulcer; Survey; Maniema province; The democratic republic of the congo

Background

Mycobacteriumulcerans infection or Buruli ulcer (BU) is endemic in more than 30 countries worldwide. Africa is the most affected continent with 16 confirmed endemic countries (Benin, Cameroon, Central African Republic, Congo, Côte d'Ivoire, the Democratic Republic of the Congo (DRC), Equatorial Guinea, Gabon, Ghana, Guinea, Liberia, Nigeria, Sierra Leone, South Sudan, Togo and Uganda) and 7 suspected or potential endemic countries (Angola, Burkina Faso, Chad, Malawi, Mali, Tanzania and Zambia). In the DRC, a survey conducted in 2004 showed the presence of suspected cases of BU in five of the country's 11 provinces (Bas Congo, Bandundu, Equateur, Maniema and Province Orientale) [1]. A National Buruli ulcer control program (NBUCP) has been established since the survey and control activities focused on the endemic foci of the province of Bas Congo [2]. The Evangelical Medical Institute of Kimpese and the Mother Teresa Center of Kinshasa serve as reference centers for medico-surgical management of BU cases. Integration of the management of BU cases in outlying areas is organized in the health zones (HZ) of Kimpese and Songololo since 2007 [3,4]. The cumulative number of cases of BU at the end of 2012 in

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the DRC is estimated at 2,984.

During the 14th annual meeting of Tuberculosis and Leprosy Control Provincial Program Managers in the DRC, also in charge of the fight against Buruli ulcer, held in Kinshasa in September 2009, the Provincial Medical Inspector of Maniema province, one of the five provinces suspected of being endemic for BU in the DRC, reported the detection of 126 suspected cases of BU, based on clinical features of the lesions. However, no laboratory confirmation was obtained for any of these suspects. This was one of the major reasons that enabled us to mobilize technical and financial resources from the World Health organization (WHO) in order to carry out a rapid prevalence assessment survey (RPAS) of the prevalence of Buruli ulcer in the health district of Kasongo, in the southern part of the Maniema province. This survey was designed to confirm suspected cases of BU, evaluate the extent of the problem of this neglected tropical disease (NTD) in this province and to provide support for case management and control measures if necessary.

Method

The methodology of the rapid prevalence assessment survey (RPAS) is the one proposed by the Buruli ulcer control Program of the WHO Regional Office for Africa. This method was previously used in other countries of the WHO African Region such as Nigeria (2006) [5] and Equatorial Guinea (2009) to confirm the presence of this Neglected Tropical Disease that is Buruli ulcer. It consists of:

• Increasing awareness of health workers at the peripheral level by prior briefing on Buruli ulcer disease, at least one month before the survey

• Information and sensitization campaign through the use of posters on BU, messages on local radio (jingles), town criers using megaphones, and screening the film on BU "The mysterious disease", developed by WHO, in communities of BU suspected endemic areas (wetlands in hot and humid climate, located in valleys or along slow-flowing rivers and in rice growing areas with natural or artificial irrigation such as dams)

• Review of suspected BU cases, presenting in health facilities as a result of the information and sensitization campaign

• Awareness and sensitization session for school-age children in classrooms followed by clinical screening for suspicious lesions of BU, including skin scars of chronic wounds

• Sampling of suspicious lesions by swab or fine needle aspiration (FNA) which are sent to reference laboratories for confirmation of the diagnosis by microscopy using the Ziehl Nielsen staining technique or by PCR

• Initiation of the combined antibiotic treatment, recommended by the WHO and associating rifampicin tablets with injection of streptomycin for strongly suspected cases of Buruli ulcer, based on the clinical features of lesions (ulcers or wounds with protruding and under-mined edges, necrotic and yellowish basement, and relative indolent lesions prior to ulceration). Other suspected cases are managed with simple wound-dressings and non-specific antibiotics in case of over-infection of wounds, pending confirmation of the diagnosis by laboratory tests

The survey team included a staff member of the National BU Control Program in the DRC, a medical student trained for the purpose of the survey on clinical examination of BU suspect cases and on the technique of sampling specimens of BU lesions by swabbing of FNA, and the Head Biologist of *Mycobacterium* laboratory at the National Institute for Biomedical Research (INRB) of Kinshasa. This team from Kinshasa was supported at provincial level by a Medical Officer in charge of Medical Emergencies in the WHO sub-office of Kindu, the provincial capital of Maniema province, the Chief Medical Officer of the province, the Leprosy and Tuberculosis program provincial supervisor and the BU focal person in the District of Kasongo. The whole team participated in the survey in the health zones of Kibombo and Samba, while in the four other health zones, only the medical student, the BU focal person of Kasongo and health workers in peripheral health facilities participated to the search of Bu suspected patients.

Information on suspected cases of BU were entered on the clinical and therapeutic forms of UB (BU01 form) and compiled on the pages of the BU register (BU02 form). The swab and FNA specimens of lesions were sent to the laboratories in Kindu and to the INRB of Kinshasa for diagnostic confirmation, using the laboratory examination request forms (BU03) [6-8]. The following WHO definitions from Buruli ulcer training modules [9] were used:

Suspected case of Buruli ulcer: Any person with a painless swelling or an ulcer or a scar further to such an ulcer, living in or having visited a BU endemic area

Confirmed case of Buruli ulcer: A suspected case of Buruli ulcer that has been confirmed by one or more of the following laboratory tests: demonstration of acid fast bacilli (AFB) in a smear from the lesion; a positive culture of *M. ulcerans* from the lesion; characteristic histology on a tissue specimen from the lesion; positive polymerase chain reaction-based (PCR) test for *M. ulcerans* on a specimen from the lesion

Results

The survey in the Southern part of Maniema province took place from 12 March to 23 April 2010 and involved six of the nine health zones of Kasongo district (Kasongo, Kibombo, Kunda, Lusangi, Salamabila and Samba) as well as General Reference Hospital (GRH) in Kindu (see map of the health zones visited in Maniema Province in Appendix 1). Three health zones in the district were not be visited for accessibility and security reasons (presence of rebellion troops).

A total of 66 suspected cases of Buruli ulcer were found at the Hospital of Kindu and in the six visited health zones in the southern part of the province of Maniema. The lab tests with Ziehl-Nielsen technique have confirmed 9 cases of BU. PCR tests performed at the INRB of Kinshasa further to a support mission of the Institute of Tropical Medicine in Antwerp, Belgium, confirmed eight cases of BU, including three who were not positive to the Ziehl Nielsen (ZN) test in the field. This makes a total of 12 BU patients confirmed by ZN and/ or PCR and gives a proportion of laboratory confirmation of 18% (Appendix 2).

Discussions

Suspected cases of BU were found in all visited health zones of South Maniema. This part of Maniema province is crossed by numerous rivers that are tributaries of the Congo River and feed many areas where rice is grown. The presence of Buruli ulcer has been associated with areas of rice cultivation, and the presence of stagnant water in rice fields is one of the factors contributing to the growing of *Mycobacterium ulcerans*, which is the causative agent of Buruli ulcer [10]. Based on the results of this survey all health zones in South Maniema, including those which were not visited during the survey, were classified as Buruli

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ulcer endemic areas, because of the same geo-climatic features that characterize all of them. These findings are similar to those of previous studies in the same province [11].

The low confirmation rate of BU suspected cases by laboratory tests (18%) could be explained by the fact that many of the suspicious lesions which were sampled were very old wounds and had been evolving for several years. The disappearance of the pathogenic *Mycobacterium* from very old lesions explains the self-healing of untreated patients or patients treated with traditional medicines whose effectiveness has not been demonstrated. Untreated BU has a long chronic course, with low mortality but causing retracting scars responsible of joint contractures of the limbs that are commonly observed in patients who healed spontaneously.

All visited communities had the same conception of the disease and qualified it as a curse. This is also mentioned in Kibadi and all publication on the names given to Buruli ulcer in BU endemic countries of Africa [12]. The arrival of the survey team was appreciated everywhere and the inhabitants of the visited areas visited were curious about the therapeutic outcome of antibiotics provided to found cases.

Based on the effectiveness of this rapid prevalence assessment survey (RPAS), which enabled to confirm BU endemic health zones in Southern Maniema, the WHO Regional Office for Africa has developed a plan of surveys to confirm the endemicity of Buruli ulcer in other suspected endemic provinces of the DRC (namely Bandundu, Equateur and Province Orientale) and in other member states of WHO African Region such as Angola, Liberia, Nigeria and Sierra Leone.

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Health workers in health facilities that accompanied the survey team and provided support for case management of found patients

Political, Administrative, Religious and Traditional authorities who welcomed, supported and backed the visitors during the various activities

 $\ensuremath{\cdot}$ School head managers and teachers in the visited villages that have allowed access to classrooms

Various media technicians who facilitated awareness campaigns and disseminated the schedule of the visits to villages

 $\mbox{\cdot}$ Visited communities who have accepted the intrusion of the team in their societies

• Suspected cases of Buruli ulcer who voluntarily presented to health facilities for clinical examinations and sampling for lab tests

 Laboratory technicians in Kindu, INRB of Kinshasa and the Institute of Tropical Medicine in Antwerp, Belgium, who have confirmed the diagnosis in their laboratories

 \bullet The National Buruli Ulcer Control Program of the DRC, that contributed and participated to the survey

 $\ensuremath{\cdot}$ WHO Country Office in the DRC which has mobilized required resources for the survey

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