

On April 19<sup>th</sup>, 2002, the Regional Meeting for dermatovenereologists in the West of Sweden took place in Borås. Invited as guest lecturer was Dr Pierre-André Aka from the Ivory Coast. His lecture on Buruli ulcer made such an impression on the audience. Buruli ulcer is an emerging public health problem in West-Africa. We would like to share this written version with all the readers of Forum.

Lars Arenlind, Hud/STD kliniken, Borås. tel: +46-33 616 1140

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## **Buruli Ulcer, an Emerging Disease in Public Health in Cote D'Ivoire (Ivory Coast)**

**Professor Pierre André Aka, MD, dermatologist and specialist in leprosy**

Director for the Clinic for Dermatology in Abidjan Plateau  
17 BP 420 Abidjan 17, Ivory Coast  
Fax 225-20215427  
e-mail paaka@afnet.net  
web site: www.afnet.net/paakaPierre  
André Aka, M.D.



### **General information**

Buruli ulcer is ranked by WHO among the emerging problems in public health. It is most frequently found in the tropical zone in West Africa where the climate is hot and humid, more precisely in the Guinea Gulf, i.e. from Guinea to Ghana. The disease affects particular young people in swampy areas far from towns and hence deprived of access to basic health care.

An increasing number of registered cases of the disease in Ivory Coast as well as a geographical extension of the endemic regions, with many unknown parameters in terms of immunological responses, characterise this third mycobacterial disease. The bacterium belongs to the same family as leprosy and tuberculosis but causes very dramatic wounds with disabling sequelae when the affected persons are less than 15 years old. The microbe develops under certain circumstances and produces destructive toxins that can create deep necrosis reaching the bone.

### **Strategies used in the fight against buruli ulcer in Cote D'Ivoire (Ivory Coast)**

#### *1. Epidemiological aspect*

Buruli is the name of a canton in the district of Busoga near the Victoria Nile north of Lake Victoria in Uganda (East Africa). The disease is in the emerging stage, raging in endemic regions in West Africa, particularly in Ivory Coast and Benin where the number of registered cases of Buruli ulcer is higher than that of tuberculosis and leprosy. The most exposed individuals are children under 15 years of age, living in rural, very distant, and poor areas, where natural or human disturbance of the environment has created suitable living conditions for the vectors that propagate the disease (swamps, mud, inundation, dams, incomplete irrigation, deforestation, dirty rubbish etc.).

#### *2. Clinical and biological aspect*

The disease is caused by a bacillus "mycobacterium ulcerans", which lives in nature; however, the linkages between the endemic regions, the

bacillus and the human factor in the urgency of the disease are the main issues for laboratory research.

In spite of the work done by Prof Dosso Mireille (Pasteur Institute in Cocody, Ivory Coast) with the help of scientists at the most specialised laboratories in Antwerp, Belgium (Prof Portaels) and Australia and with the contribution of Professors Petit, Kingsly, and Meyers, the micro bacteria have not yet been isolated and hence the transmission from nature to human beings has not yet been explained. Increased field research with additional sampling and analysis of the toxins, the wounds and the immunological features of the sick people in West Africa will allow some progress on how the disease is transferred.

There are five stages of development of the disease:

1. Small nodules under the skin that look like simple boils. It is important to detect this early lesion.
2. Massive oedema without any wound in the skin.
3. Oedematous lesion with plaque and induration, small open wound.
4. Massive deep, necrotic sore which can cover large areas in a few days' time. The development of the sore is caused by the destructive toxins produced by the bacteria.
5. Healing or demobilising sequelae (functional or unattractive) .

Only early surgery can prevent full-fledged development of this fearsome disease. With correct medical treatment (including good hygiene and antibiotics) at an early stage, however, the development may be arrested before visible sores appear, which is why early detection and good personal basic hygiene are important. Without early treatment the natural development leads to sequelae such as blocked growth or deformation of limbs. With an early operation, the affected area is cleaned and the skin is freed from the necrosis and the destructive toxins. Very often a transplantation of skin is necessary to replace the damaged skin and re-establish new growth.

### **Development of Buruli Ulcer in Ivory Coast**

- 1978: First case observed
- End of 1978: 10 cases around Kossou, a hydro-electrical dam near Yamoussoukro in the central part of the country
- End of 1980: 46 cases observed
- 1978–1987: On average 90 cases observed annually, with cases in Bouaké, Daloa and San Pédro
- End of 1987: 205 cases observed
- 1995: 5,000 cumulated cases: The entire southern part of the country is affected, while the northern, semiarid regions seem less affected by the disease
- 1997: 10,382 cumulated cases; 200 new cases annually

- 2000: 13,000 cumulated cases, 2,200 new cases annually since 1999
- Even assuming that various efforts will make people more aware of the disease, 200 new cases per year from year 2000 on is foreseen.

#### *1. Aspects of care*

Given the dramatic extension and the severity of the damage caused, the government of Ivory Coast has established specific sanitary strategies:

- a) Registration and early tracking of cases – local health workers are important
- b) Early treatment of self-registered cases or cases discovered by health workers

Professor Asse Henri, specialist in hand surgery, is in charge of the Leprosy Institute in Adzopé, which is under the jurisdiction of Raoul Follereau Foundation, previously a centre for leprosy. In order to co-ordinate the surgery, patients with Buruli ulcer are directed to the Leprosy Institute, where they can benefit from early treatment for their limbs given by Prof Asse, who is also a WHO expert on leprosy and the President of the French African Leprosy Association which has an operation ward for the cosmetic surgery.

We have noticed that beds that were occupied by patients with leprosy earlier are now occupied

by patients with Buruli ulcer, reflecting the rise of Buruli ulcer and the decrease of leprosy. The Dermatology Centre at the University Hospital in Treichville welcomes all patients with any kind of skin diseases, particularly those with open wounds, before the patients are directed either to Adzopé or to the Department of Surgery at CH Treichville. At CHU, Prof Kadio Richard does the necessary intervention, often with skin transplantation as a secondary treatment.

Treatment with antibiotics has been very disappointing in everyday use, and research continues to explore which pharmaceutical products are the most suitable in Ivory Coast as well as in the rest of the world.

- c) In order to prepare for the WHO world initiative against Buruli ulcer, the Ministry of Public Health in Ivory Coast has created a national programme against Buruli ulcer. The programme is under the direction of Professor Jean Marie Kanga.
- d) Since everyday treatment is difficult, other initiatives have been taken to strengthen the first device. These are:
  - Dermatologists in Ivory Coast have founded a scientific association to be able to meet, discuss, decide common approaches and attitudes and to co-ordinate the activities on a national level as well as in the exchange with the scientific

international community. Since 1998 this association ("Societe Ivoirienne de Dermatologie", SIDV) has been directed by Professor Pierre André Aka, dermatologist and specialist on leprosy.

- Non-governmental Organisations have been created with the objective of taking care of patients affected by Buruli ulcer. The NGOs belong to the International Association against Buruli Ulcer.
- Rotary International has shown a firm sign of involvement through the creation of a committee against Buruli ulcer in each Rotary club.
- Rotary International and Lion's Club have created a joint committee, directed by Professor Pierre André Aka.
- A national committee for Buruli ulcer was created in 2000 with the objective of finding ways and resources to efficiently treat children with Buruli ulcer using mobile surgery equipment on a national level. This ambitious program has not yet started due to financial and logistical problems. Based on his expertise and professional profile, Professor Pierre André Aka has been appointed president of the national committee for Ivory Coast.

#### *1. Mobilising aspects*

All of these initiatives are working towards the same goal, namely to

make the disease known throughout the region, especially to donors and other partners, and through the WHO world initiative, throughout the world.

WHO has taken on, after consultations with experts, the role of giving advice on the control and priorities of future research.

#### *2. Financial aspects*

There is as yet no prevention such as vaccination in the case of Buruli ulcer. As long as no vaccine is available, the only therapeutic treatment is surgery, often combined with physiotherapy to combat deformation, ankylosis and stiffness in the limbs.

Hospital treatment is long and expensive and the family experiences disorganisation, since the mother often has to stay with the affected child, leaving the rest of the family at home without the necessary assistance. The treatment is long (on an average 3 months) but can last up to 10 months, which is expensive for the patient too, in the sense that he or she can seldom follow classes at school. As a consequence children sometimes become drop-outs, which decreases their quality of life, disturbs family patterns and can create serious problems concerning the reintegration of the treated children. The time spent at the hospital is often longer in the health centres up-country, such as in Zoukougbeu (Daloa),



Buruli ulcer (one early and one late lesion).

Kongouanou (Yamoussoukro), Zouan Hounien (Danané), Manikro (Bouaké).

The cost of treatment is extremely high (surgery, minimum of technical equipment such as operation ward with appropriate equipment in good shape, equipment for sterilisation, consumables like compresses, antibiotic bands, physiologic serum, antibiotics and equipment for transplantation, which are difficult to maintain and thus very expensive). Presently, a medical revolution appears to be underway, with a new kind of treatment involving a gentle jet stream of clay under the derm for local ulcer detersion. We will have to wait and see if it proves successful, but even if it is, it will be costly. In addition, the expenses for the early detection linked with interviews and mapping in order to finalise working documents, all with the final objective of decreasing the mor-

bidity caused by Buruli ulcer, must be included in the high costs. Good nutrition, appropriate hygienic habits, prevention of sequelae and follow-up to avoid secondary infections (like HIV and others) are also costly.

Given the following figures, the financial restrains discourage the few voluntary donors:

- Complete treatment of one patient with Buruli ulcer costs 2,700,000 FCFA or 4,500 US\$ or 4115.85 Euros.
- the PNB per capita in Ivory Coast is 425,000 FCFA or 710 US\$ or 647.87 Euros.

Hence, the care of one single person will make 6 Ivorians poorer. Health care is often given for free to sufferers of Bulumi ulcer, since the patients often come from big families in rural areas with many children.

## Conclusion

The world struggle against Buruli ulcer should aim at resolving four situations:

- The mysteries of the disease should be revealed through bacteriological research that seeks to show the linkages between changes in the environment leading to sick people, particularly young individuals with large sores.
- Social mobilisation is needed in which the local and national health workers and politicians identify necessary resources to reduce the incidence of Buruli ulcer. This can be done with strategies for early discovery and prevention.
- New therapeutic arms: the efficiency of gentle clay water jet under derm; relation between the clay and mycotoxine?
- Research for funding to meet the extremely high costs for adequate treatment must be sufficient. Funding for international organisations, NGOs, clubs etc, i.e.

funding to increase the capacity to offer early surgery treatment, must be secured. This is one challenge among others in a country that struggles with AIDS, malaria and other health problems, in addition to bad roads and decreasing prizes of raw material, the major export products.

**Professor Pierre André Aka:**  
 Former chairman of the Abidjan Rotary Club.  
 Vice president for the African Association for Dermatologists (AFRAD)  
 President for the Ivorian Association for Dermatology and Venereal Diseases (SIDV)

Chairman of the National Commission for Buruli Ulcer (Ivory Coast)  
 Chairman of the Rotary-Lion's joint committee for Buruli ulcer  
 For additional information, please contact the author.



**Produktionsré**

1. **LÆGEMIDDELSNOMME**  
 Metvix 100 mg/g lotion
2. **KNULLEBETJÆCCH KENNTEGNITIV SAMMENSÆTTNING**  
 Metvix lotion indeholder 100 mg/g metvixoximolhydroklorid (somligt saltsyde).  
 Den færdige indholdsstoffer som er K2.  
 3. **LÆGEMIDDELSFORM**  
 Fløde.
4. **Indhold i produktet per doseringsform.**
- 4.1. **KLÆBEMIDDEL**
- 4.2. **Fløde**
- 4.3. **Indhold i et produkt**
- 4.4. **Varer og deres indhold**
- 4.5. **Indhold i et produkt**
- 4.6. **Indhold i et produkt**
- 4.7. **Indhold i et produkt**
- 4.8. **Indhold i et produkt**
- 4.9. **Indhold i et produkt**
- 4.10. **Indhold i et produkt**
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- 4.18. **Indhold i et produkt**
- 4.19. **Indhold i et produkt**
- 4.20. **Indhold i et produkt**

Lokal smed i bløtdende sår (inkl. forbrændinger)	Mestekt varig (1-1/10)	Behandlede kløbe, knude, odel, sår, sår, sår, sår
	Yndige (1-1/10, -1/10)	Fraktur, skramme, sår, sår, sår, sår, sår, sår, sår, sår
	Mindre varig (1-1/10, -1/10)	Lukket, sår, sår, sår, sår, sår, sår, sår, sår

Denne rapport omfatter en række af de vigtigste, kliniske, toksiske, og farmakologiske data, som er blevet indsamlet ved forsøg på mennesker. De enkelte forsøgsresultater er beskrevet i de enkelte kapitler.

**4.1. Farmakodynamik**  
 Metvixoximolhydroklorid er en lokal smed, som virker ved at reducere væksten af bakterier og sår, og som har en betydelig effekt på at reducere smerten og ødemet i bløtdende sår.

**4.2. Farmakokinetik**  
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