

# UNFAMILIARITY OF PRIMARY AMOEBIC MENINGOENCEPHALITIS IN DEVELOPING COUNTRIES

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We report a case of primary amoebic meningoencephalitis in Nigeria in a 7-year old boy from a rural area. The clinical course was classically that of meningoencephalitis and laboratory diagnosis was from the cerebrospinal fluid and pond water specimen which showed free-living structures of amoeba of Naegleria species. Methods available could not differentiate the Naegleria species. Investigation revealed that the boy played and swam in a village pond for many years before his death and the pond was infested with free living amoebae. Despite the world-wide nature of the disease, the reporting of the cases had been very rare. The apparent rarity of the reporting world-wide and in particular in developing countries result in ignorance of people of the disease.

**Key words:** Primary amoebic meningoencephalitis, developing countries, unfamiliarity problems.

*Eur J Gen Med 2006;3(4):190-192*

## INTRODUCTION

Primary amoebic meningoencephalitis (PAM) is usually an acute disease. It is often caused by Naegleria species of small, free-living organisms. These organisms live in their infestive stage in pockets of water like ponds, swimming pools and small lakes in drainage, ditches and swamps. Those who come into contact with such infested water have increased chances of contracting PAM. Reported cases are world-wide and to date October, 2004 only about 200 cases have been reported (1). The disease is frequently fatal, difficult to diagnose and does not have effective therapeutic options (2-6).

The determinants of Primary amoebic meningoencephalitis (PAM) are many especially where water supply for drinking and for domestic use is inadequate and poor, and also where such bodies of water offer recreational opportunities to the people. The shortage of water was highlighted by Megan et al (7) who in their earlier work stated that approximately 1.1 billion persons living in low income countries lack access to adequate water supply. Despite the world-wide nature of the disease and the fact that

reports of the cases had been long before the sixties, infection caused by the small free-living amoebas are still unfamiliar to health workers even in developed countries (1). This unfamiliarity would be worse in developing countries to workers notably clinicians, pathologists and laboratorians. The Nigerian experience in this case report is hoped to create awareness of this disease and highlight the salient problems that militate against the reporting of such cases. This poor or lack of reporting helps perpetuate ignorance of the disease among health workers especially in developing countries like Nigeria.

## CASE

A 7-year old boy was admitted to the study base hospital at 21<sup>A</sup> Park Road Aba, Abia State. He was brought by the mother from a rural area of Ngor-Okpala Local Government of Imo State. Imo State is a neighboring State of Abia State about 60km away from Aba. The mother gave a history of a 6-day illness of blocked nose, severe headache, nausea and vomiting. A day before the child came to the hospital, he developed stiff neck and became progressively lethargic. A quick

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examination showed no focal neurological signs and no marks of present or previous injury on the body. Cerebrospinal fluid (CSF) was collected by lumbar puncture and 6 hours later, the boy died. Lumbar puncture showed cloudy cerebrospinal fluid (CSF) with leukocyte count of  $6.7 \times 10^9$  /L and 90% neutrophils, 2.5 mmol/L glucose and 4.53 g/L protein.

On admission, the patient had a temperature of 38°C. The peripheral blood leucocyte count was  $12.78 \times 10^9$  /L and C-reactive protein level was 1.2mg/L. Cerebrospinal fluid (CSF) showed free-living structures which had irregular shape and changed constantly. It had non-directional motility with pseudopodia. The protoplasmic mass was made up of cytoplasm and nucleus. The food and contractile vacuoles were seen in the cytoplasm. The mean diameter of such structure was 10–12 µm. The mononuclear cells were isolated and each cell was able to develop biflagellate form in water. The laboratory diagnosis of the structure was free-living amoeba of *Naegleria* species. Methods available could not differentiate the *Naegleria* species.

The mother consented to go back to her village in the neighboring State with the microbiologist and the medical social worker for investigation. At the village after the protocol of seeing the spouse and the village head, the two medical staff found out that the deceased fetched water from a village pond once or twice daily where he played and swam with his friends. There was only one hand pump bore-hole where everybody got water mostly for drinking. The borehole water was grossly inadequate for even the drinking water needs of the villagers and therefore, the pond water became a place for boys and girls to play and swim as well as to collect water for the domestic household use. It was found out that the deceased boy had never traveled out of his village and also never had any immunization. The village had a health care facility 6 kilometers away which the people never patronized. Herbal medicine and folk remedies were the choice of medication when ill. The travel to Aba for medication by the boy and the mother was almost aborted because of ignorance and financial cost implications.

The villagers admitted that within the past 10 years, two other children, a boy and a girl, who played, swam in and fetched water from the pond died in such a manner with similar physical features as the 7-year old boy. They were buried and never investigated by

anybody. The villagers hoped that our efforts would be rewarding. Three (3) samples of water from the pond and nasal swabs from the 20 children who swam in the same land locked pond water were taken although none became ill. A feed back to unravel the mystery of the death was expected from the authors. The samples were later taken for analysis to the laboratory at Aba. Similar results notably of many free-living structures with features similar to the organism found in CSF were observed using x40 objective lens. No nasal swab was positive for amoeba.

## DISCUSSION

The clinical presentations, epidemiological history and laboratory tests showed that the patient had primary amoebic meningoencephalitis caused by *Naegleria* spp. The entry point could have been through the cribriform plate of nasal cavity when he was playing and swimming in the infested village pond (8).

The disease is world-wide with high fatality rate and yet there is unfamiliarity of this disease among clinicians, pathologists and laboratory workers (9).

Fetching pond water and using the water for recreation are issues affecting many people especially in the developing countries where water is not only deficient in quality, but also inadequate in quantity to meet the water needs of the populace. Non-existent or poor health facilities coupled with ignorance of water-related diseases would make early intervention impossible.

This study is the third reported case of meningoencephalitis in Nigeria. The first one was reported by Cleland in 1982. The determinants of this disease are many in Nigeria and other developing countries but only few cases are reported. This reported case would have been missed but for high index of suspicion of hospital workers, adequate laboratory facilities making laboratory diagnosis possible and finally good research initiative that motivated village investigation.

With regard to this report programme could be designed on health education against the use of the pond water, provision of adequate water supply and alternative acceptable recreational facilities for the villagers. Water related diseases and environmental health and early detection and treatment of such diseases, even though the disease currently have a bad prognosis, could form part of the programme.

The picture presented in this report repeats

in various areas all over the world but most commonly in the developing countries. The disease determinants are abundant all over the world and as expected cases have been reported in every continent. It is very likely that there is gross under-reporting of the cases most likely because of ignorance of people about the disease. Attempts should be made to improve the level of familiarity of the disease among health workers, there should be treatment opportunities, diagnostic facilities and research ethic to improve the diagnosis and reporting of the disease

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