

# Epidemiology of Cerebral Malaria and Its Mortality

Pages with reference to book, From 213 To 215

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## Abstract

Over the past 5 years, 1620 comatosed patients of both sexes aged 1-75 years were screened for cerebral malaria. Of these, 505 (31.2%) were positive for Plasmodium falciparum. During this period frequency of malaria increased from 22.1% in 1991 to 44.4% in 1995. Sixty-four percent cases of cerebral malaria were seen in children and thirty-six percent in adults. Mortality was also higher (41%) in children than in adults (25%). As cerebral malaria is particularly prevalent in Pakistan and is a major community problem, accurate and easier methods of its diagnosis are needed at primary health care level, in all febrile comatose patients, without focal neurological findings. (JPMA 47:213,1997).

## Introduction

Cerebral malaria is associated with increased mortality in endemic areas, especially in children<sup>1</sup>, Most deaths occur within 3 days of admission. Altered consciousness in presence of P. falciparum must be taken as a clinical indication of cerebral malaria. Convulsions occur in children and adults. Neck rigidity is not a feature, although mild neck stiffness may be present. Raised intracranial pressure is not seen in cerebral malaria. Focal neurological signs are uncommon. Severe malaria is defined parasitologically as over 5% of red cells parasitised, although complicated malaria can occur with only 1% of red cells parasitised; clinical assessment is therefore very important. The major differential diagnoses include meningitis, meningoencephalitis and delirium commonly found with high grade fever<sup>2</sup>. This study reports a gradual increase in the prevalence of cerebral malaria over the last five years.

## Patients and Methods

To determine the frequency and mortality of cerebral malaria, all febrile patients admitted to medical and paediatric units of Jinnah Post graduate Medical Centre (JPMC), Karachi (1000) and Sandeman Provincial Hospital, Quetta (620) from January, 1991 to December, 1995 with drowsiness, headache, psychosis, delirium, hallucinations or seizures progressing to coma with their blood smears positive for Plasmodium ring stage or trophozoites were included in this study. Eighty-one of these cases had jaundice.

Investigations included thick and thin blood smears for malarial parasites and analysis of cerebrospinal fluid. Ten consecutive fields of thick blood films stained with giemsa stain were examined under a microscope with a magnification of X 100 for malarial parasites. Blood smears of all patients with cerebral malaria were positive for P. falciparum with ring stage trophozoites and cerebrospinal fluid analysis was normal. All of 81 icteric patients in this study had negative viral serology. Blood culture done in 29 patients was negative. Investigations were done in Basic Medical Sciences Institute, JPMC, The Lab, Aga Khan University Hospital Laboratory in Karachi and Diagnostic Laboratory, Fayaz Lab and Clinical Laboratory of Sandeman Provincial Hospital in Quetta.

## Results

A total of 1620 febrile cases of both sexes, progressing to coma were screened. Fifty percent patients with cerebral malaria were children between 0 to 15 years and 19% were adults (Figure 1).

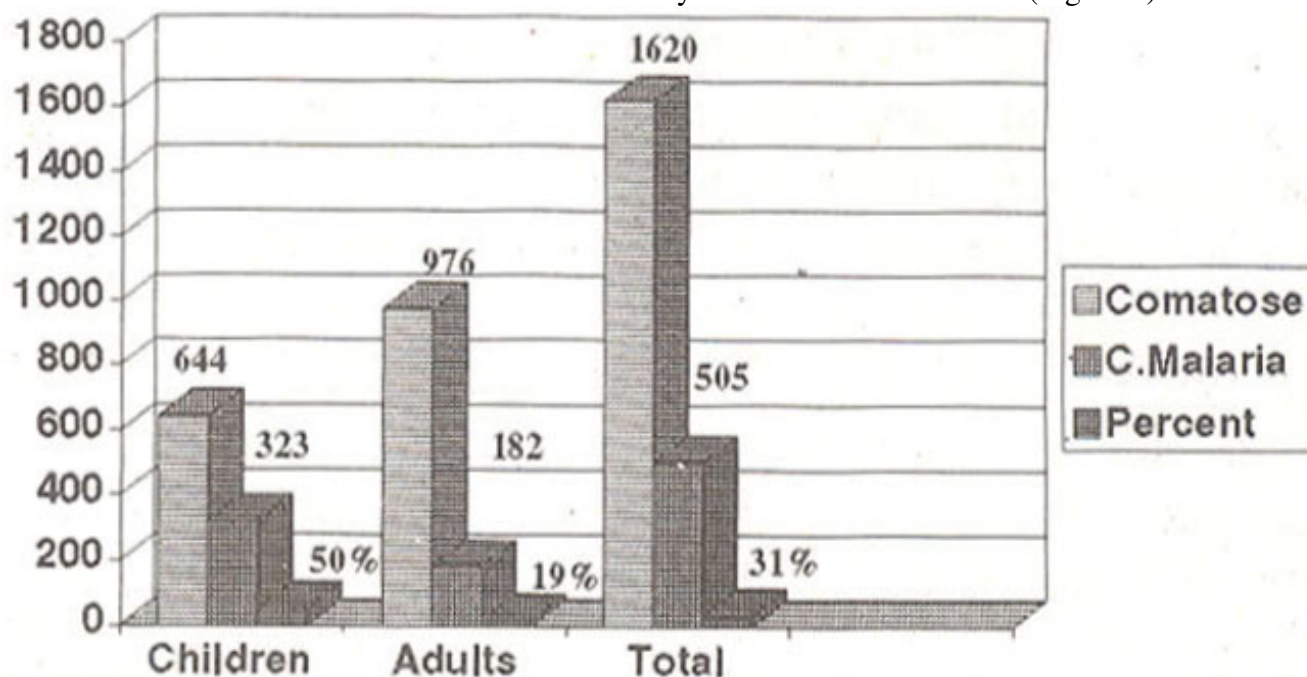


Figure 1. Incidence of cerebral malaria in children adults and total number of comatose patients.

Thirty one percent (505), febrile comatose patients including 264 males and 241 females, had cerebral malaria.

Table I. Age distribution of cases with cerebral malaria.

| Age group   | Total number of febrile comatose patients | No. of cases of cerebral malaria | %    |
|-------------|---|----------------------------------|------|
| 0-15 years  | 644                                       | 323                              | 50.2 |
| 16-30 years | 318                                       | 69                               | 21.7 |
| 31-45 years | 408                                       | 80                               | 19.6 |
| 46-60 years | 245                                       | 32                               | 13.1 |
| 61-75 years | 5   | 1                                | 20.0 |
| 5 years     | 1620                                      | 505                              | 31.2 |

Table I shows the age distribution of these cases. A rise in the frequency of cerebral malaria was seen over the last 5 years. The yearwise distribution is given in Table II.

**Table II. Frequency of cerebral malaria in comatose patients.**

| Year    | Total number of febrile comatose patients | No. of cases of cerebral malaria | %    |
|---------|---|----------------------------------|------|
| 1991    | 271                                       | 60                               | 22.1 |
| 1992    | 336                                       | 85                               | 25.3 |
| 1993    | 293                                       | 85                               | 29.0 |
| 1994    | 344                                       | 123                              | 35.8 |
| 1995    | 376                                       | 152                              | 40.4 |
| 5 years | 1620                                      | 505                              | 31.2 |

No significant difference was seen in the incidence of cerebral malaria, in Karachi and Quetta (Table III).

**Table III. Incidence of cerebral malaria in Karachi and Quetta.**

| City    | Total number of febrile comatose patients | No. of cases of cerebral malaria | %    |
|---------|---|----------------------------------|------|
| Karachi | 1000                                      | 315                              | 31.5 |
| Quetta  | 620                                       | 190                              | 30.6 |
| Total   | 1620                                      | 505                              | 31.2 |

The highest mortality was seen in children as given in Figure 2,

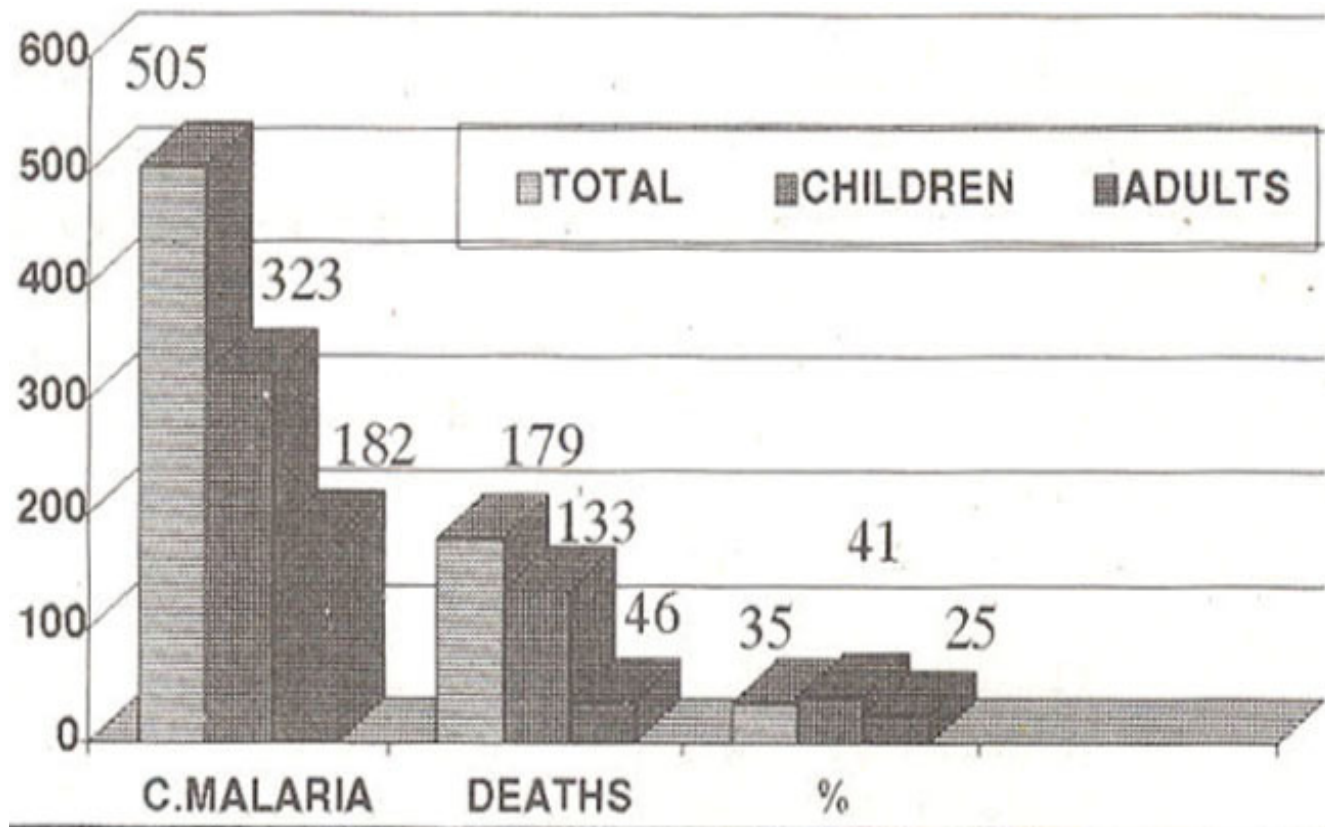


Figure 2. Mortality of cerebral malaria.

which also illustrates the mortality in adults and total number of patients with cerebral malaria. More than five million cases of malaria are reported annually from countries south of Sahara. About 75% of these cases are from 9 countries including India<sup>3</sup>. Although, Pakistan is not included in this group, but malaria is endemic in this country. Falciparum malaria is seen with varying presentations including cerebral malaria and fulminant hepatic failure<sup>4,5</sup>. Cerebral malaria is the most important complication of falciparum, being the predominant species of Plasmodium in the last decade<sup>6</sup>. During the five years study the frequency of cerebral malaria in febrile comatose patients ranged from 22.1% to 40.4% with a gradual increase from 1991 to 1995. Although children account for 50% of cerebral malaria, the frequency has also increased in adults. The general increase in frequency is very alarming. If this persists then we would be facing a very complicated situation. Our life style, low literacy, geographical location, irrigation and agricultural methods encourage standing pools of water, all contribute to this situation. Cerebral malaria carries a very high mortality and morbidity<sup>6,7,8</sup>. To prevent the general increase in frequency and thus decreasing the mortality, new strategies for its control are needed. Early diagnosis and effective treatment should be the main control measure in this situation. Impregnated bednets may also be helpful.

## References

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