

Original Research Article

Management of Severe and Complicated Malaria in Adults in the Emergency Department of the Regional Hospital of Maradi (Niger)

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Abstract: Introduction: In sub-Saharan Africa malaria is the 1st cause of consultation and hospitalization and the 2nd cause of death in health centres. Maradi region is one of the most malaria-endemic areas with periods of high prevalence, particularly during the rainy season, due to the heavy rainfall that occurs between May and October. **Methods:** This is a descriptive cross-sectional study conducted in the emergency department of the Regional Hospital Centre of Maradi from August 1st to August 31st, 2017. **Results:** 104 patients were admitted to the adult emergency department for severe malaria out of 305 admissions to the centre, i.e., a prevalence of 34.1%. Our sample was composed of 53.84% men (n=56). The average age of our patients was 38.6 years with extremes ranging from 15 to 90 years. Most of the patients had no comorbidity (80.76% of cases). Thick blood drop was used for diagnosis in 93.25% of cases (n=97). The main clinical manifestations were: neurological forms (34, 61% n=36), severe anemia (31, 73% n=33). **Conclusion:** This study shows that malaria is a major public health problem in sub-Saharan Africa and particularly in Niger because of its prevalence, severity and morbidity.

Keywords: Management, severe malaria, adults, emergency department, Maradi, Niger.

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INTRODUCTION

Malaria remains the largest parasitic endemic worldwide, nearly half of the world's population was at risk of malaria in 2015 in 91 countries, which there were 212 million malaria cases and 429,000 deaths [1, 2]. Malaria morbidity and mortality have declined significantly since 2000 but this remains significant in 2015. Most malaria cases and associated deaths are estimated to occur in the WHO African region (88%). In 2015, 90% of malaria cases and 92% of deaths occurred in 13 countries in this region [1, 2].

However, the percentage of malaria infections among the population at risk in sub-Saharan Africa decreased from 17% in 2010 to 13% in 2015 [1-4]. In Niger, malaria remains a major public health problem, in that it is the 1st cause of consultation and hospitalization and the 2nd cause of death in health centres, particularly among children under 5 years of age [3,4]. The region of Maradi is one of the most

malaria-endemic areas with periods of high prevalence, particularly during the rainy season, due to the heavy rainfall that occurs between May and October [6].

The Emergency Department (EC) acts as a primary access point for entry into the healthcare system [5]. The problem of management and the lack of previous studies in the emergency department of the Maradi Regional Hospital on this issue motivated the choice of this topic.

The objective of this study is to determine the epidemiological, clinical and therapeutic aspects of severe malaria in adult in the emergency department of the Regional Hospital Centre (CHR) of Maradi.

METHODS AND MATERIALS

Study Design

This is a descriptive cross-sectional study conducted in the emergency department of the Regional

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Hospital Centre of Maradi from August 1st to August 31st, 2017.

The study was conducted at the Maradi Regional Hospital. This hospital is a regional referral Centre, that it receives patients from other centres that do not have sufficient technical facilities or the necessary skills. The emergency department which was the subject of our study includes a triage and referral unit for adults and children, an emergency hospitalization unit and shock unit.

The study population consisted of adult subjects of both sexes over 15 years of age admitted for severe malaria confirmed according to the severity criteria defined by WHO.

Severe malaria is defined in any patient with at least one World Health Organization (WHO) severity criteria associated with a positive thick drop and/or a positive rapid diagnostic test (RDT) sensitive to *Plasmodium falciparum* regardless of parasite density.

The antimalarial drugs used were parenteral artemether at 3.2 mg/kg intramuscular (IM) the first day, then 1.6 mg/kg from day 2 to 5, parenteral artesunate at 2.4 mg/kg intravenous (IV) at H0, H12, H24, day 2 to 5 with oral relay as long as the patient's clinical condition improved followed by 3 days of artemisinin-based combination therapy (ACT) (World Health Organization, 2015), and quinine at a dose of 24mg/kg/24 hours [4-7].

The other therapeutic means were transfusion of red blood cells at a dosage of 20ml/kg, antibiotic therapy, hydro-electrolytic support and nursing care.

We included in our study all patients of both sexes hospitalized for severe malaria with a positive thick blood drop and/or a positive rapid diagnostic test (RDT) sensitive to *Plasmodium falciparum* and who met the WHO criteria for severity of malaria.

All patients with a condition other than malaria that may have caused the clinical symptomatology and/or death were not included in our study.

The following variables were studied: age, sex, origin, existence of comorbidity, clinical manifestation of severity and treatment administered

Data Collection and Statical analysis

Data collection was done with strict respect for anonymity after an informed consent. The data were collected on a form designed for the purpose of the study.

Data analysis was performed with the software: Epi info, version 3.6. We calculated

proportions with 95% confidence intervals (CIs). Data entry and presentation of figures with Microsoft Excel and Word 2013.

RESULTS

During this study period, 104 patients were admitted to the adult emergency department for severe malaria out of 305 admissions to the centre, i.e., a prevalence of 34.1%.

Our sample was composed of 53.84% men (n=56) and 46.16% women (n=48), a sex ratio of 1.16 in favor of men. The average age of our patients was 38.6 years with extremes ranging from 15 to 90 years?

The age range 16-25 years was the majority (38.46% n=40) followed by the age range 26-50 years in 34.61% of cases (n=36), the age range 51-65 years in 15.38% (n=16). The age group over 65 years was represented in 11.53% of cases (n=12).

The majority of our patients came from the city of Maradi (58.65% n=61) while 41, 34% (n=43) come from others health centres according to the referral and counter-referral system.

Most of the patients had no comorbidity (80.76% of cases); hypertension and diabetes were found in 13, 46% (n=14) and 5, 76% (n=6) of patients respectively. In terms of biology, all patients had a thick drop for the diagnosis of malaria, a CBC, venous glycemia, urea and creatinine.

Thick blood drop was used for diagnosis in 93.25% of cases (n=97) and rapid diagnostic test (RDT) in 6.73% of cases (n=7).

The manifestations of severe malaria (fig. 1) were: neurological forms (34,61% n=36), severe anemia: Hb < 5 g/dl (31,73% n=33), hypoglycemia (6,73% n=7), acute respiratory distress syndrome (7,69% n=8), Acute renal failure (5,76% n=6), shock and cardio-vascular collapse (6,73% n=7), and jaundice (3,84% n=4), mixed forms that combine several signs of severity (2.88% n=3).

Treatment consisted of the administration of artemether (67, 30%, n=70), artesunate injection (24,03%, n=25) and quinine (8.65%, n=9) combined with antibiotic therapy (70.19%) and blood transfusion 28/33 patients with severe anemia such as 26,92% of all patients.

The evolution of patient after treatment is characterized by death rate (22.11% n=23), the recovery of patients 29, 80% and transfer to other departments 48,07%.

Table-I: Distribution of patients according to characteristics: epidemiological, clinical and therapeutical

Parameters	Classification	Number	Frequency
Gender	Male	56	53.84%
	Female	48	46,16
Age, yr	16-25	40	38.46%
	26-50	36	34.61%
	51-65	16	15.38%
	> 65	12	11.53%
Provenance	Rural	43	41.34%
	Urban	61	58.65%
Education	Unschool	48	46,15%
	Primary school	29	27,88%
	Secondary School	16	15,38%
Medical history	Graduate or Higher	11	10,57%
	No One	84	80.76%
	Hypertension	14	13.46%
Diagnosis	Diabetes	6	5.65%
	Thick blood drop	97	93.25%
Treatment	RTD	7	6.75%
	Artesunate	25	24,03%
	Artemether	70	67,30%
Antibiotics	Quinine	9	8,65%
	Yes	73	70,19%
Blood Transfusion	No	31	29,80%
	Yes	28	26,92%
Evolution	No	76	73,07%
	Recovery	31	29,80%
	Transfer	50	48,07%
	Death	23	22,11%

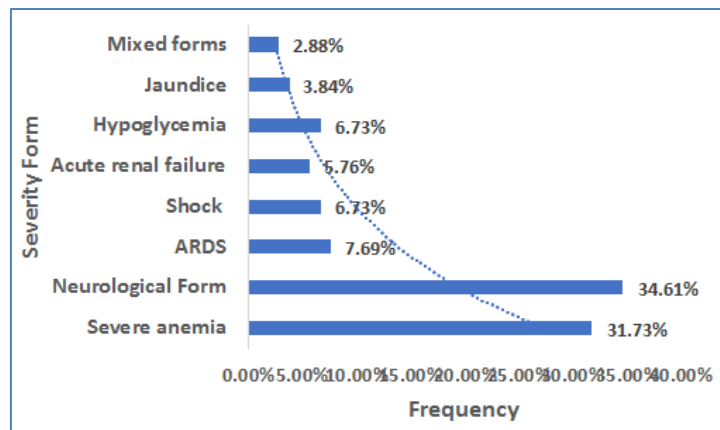


Fig-1: Distribution of patients according to severity form of malaria

DISCUSSION

The findings of this study revealed that management of severe malaria in emergency department in Niger remains one of the priorities because of its prevalence, severity and morbidity. Our work shows several epidemiological and clinical challenges during severe malaria in adults in an emergency department during the peak period. This study shows that the morbidity of severe adult malaria in Niger during the peak period remains high (34.1%). This situation is comparable to that reported by other studies in sub-Saharan Africa and India [6-11].

The choice of the period of this study confirms the persistence of high frequencies during the raining period compared to the so-called dry period of the year during which the hatching of parasites and larval sites remain less as reported by S. Kadri *et al.* in Maradi (Niger) [6].

We observed a difference between the origin of the patients and the occurrence of severe malaria with a slight predominance of children from the city of Maradi, this could be explained by the proximity of the hospital to this population. Patients coming from other centres are complicated cases that have encountered

difficulties in management. This is illustrated by several African studies [6-11]. Diabetes and hypertension remain the most associated comorbidities in the occurrence of severe and complicated malaria in emergency departments. Neurological and anemic complications are the main forms of malaria severity encountered. This has been reported by several African authors [6-10].

The treatment is based on parenteral artesunate, artemether or quinine. This is in accordance with the new guidelines of the national malaria control program and the WHO which recommends the administration of the parenteral artemisinin drug, artesunate, is a first-line treatment for severe *Plasmodium falciparum* infection worldwide [10-13].

CONCLUSION

This study shows that severe malaria in adults is a major concern in clinical practice in the emergency department, particularly in high frequency areas. Anemic, neurological complications constitute the main clinical presentations of severe and complicated malaria in the emergency department.

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