



A Prospective Study to Identify the Co-Relation of a Disease Severity of Complicated Malaria & Clinical Outcome

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ABSTRACT

It was a prospective study of 100 patients of *P. Falciparum* and *P. Vivax* complicated malaria admitted in tertiary care hospital. Patients were classified according to WHO criteria for complicated malaria. They underwent routine investigations and special investigation e.g. ABG, PT, aPTT, QBC and RDT were carried out as and when required. The effect of antimalarial treatment and outcome of complicated malaria was studied. We found that haematological alteration was common in complicated malaria with thrombocytopenia presented in 66% cases. All the patients were treated with either Artesunate compounds (98% cases) or Quinine (2% cases). Artesunate was found to be a better drug in terms of tolerance and side effects. Prognostically ARDS was found to be the worst complication. We also observed that more the combination of complications, more chances of morbidity and mortality in complicated malaria.

KEYWORDS

Complicated malaria, ARDS,

Aims & Objectives:

To study the clinical manifestations and laboratory parameters, effect of antimalarial treatment and outcome of complicated malaria.

Materials and methodology:

It was a prospective study consists of 100 cases of *P. Falciparum* and *P. Vivax* complicated malaria admitted in tertiary care hospitals of Ahmedabad and Gandhinagar from September 2012 to October 2013. Patients from age >13 years of both the sex were included. A thorough history taking and clinical examination was carried out. Hemogram, thick and thin smears stained with Giemsa stain were done in all patients. All the patients were classified according to WHO criteria and only complicated cases were included. Routine investigation including LFT, RFT with electrolytes, urine routine and micro, RBS, chest X-ray and ECG were done in all cases. Other investigations like Ultrasonography of abdomen and kidney, ABG, PT, aPTT, QBC and RDT were carried out as and when required. All the patients were treated with Artesunate compounds or Quinine along with other supportive treatment and the clinical outcomes noted.

Results and Discussion:

In present study, males were 67% and females were 33%. High number of males patients may be attributed to higher risk of acquiring malaria because of the more outdoor life²⁹, male dominant society, an earning family member, attention to the disease is sought (25)(18). The young population shows higher immune response to parasites leading to more incidences of complications (29). Majority of patients were from low socio-economic class (66%). None of the patient was from upper socio-economic class.

Table 1: Gender distribution

Gender	N=100
Male	67%
Female	33%

Table 2: Age distribution

Age (years)	N=100
13-20	15%
21-30	27%
31-40	23%
41-50	14%
51-60	17%
61-70	2%
71-80	3%

Table 3: Symptoms on admission

Symptom	N=100
Fever with rigor	90%
Vomiting	60%
Headache	40%
Altered sensorium	23%
Bleeding from any site	3%
Abdominal pain	20%
Convulsion	10%
Yellow sclera/ urine	5%
Oliguria	4%

In our study, fever with rigor was present in 90%, vomiting in 60%, headache in 33%, altered sensorium in 23%, abdominal pain in 20%, convulsion in 10%, oliguria in 4% of patients. Fever was present with rigors, high grade, intermittent and was associated with myalgia and headache.

Table 4: Clinical signs

Clinical signs	No. of cases (n=100)
Icterus	63%
Pallor	31%
Hepatosplenomegaly	18%
Signs of dehydration	5%
Cyanosis	2%

In this study, icterus on examination was present in 63%, pallor in 31%, hepatosplenomegaly in 18% and signs of dehydration in 5% of cases. Anaemia is common in our society. The patients who suffered from malaria are more likely to have acute severe anaemia because of increased destruction of RBCs, bleeding tendency, decreased nutritional intake and due to immune suppression of bone marrow.

Table 5: Hemogram and peripheral smear examination

Haemoglobin (gm%)	<5	31%
	5-12	54%
	>12	15%
WBC count (per uL)	<4000	13%
	4000-10000	61%
	>10000	13%
Platelet count (per uL)	<50000	42%
	50000-1 lac	43%
	>1 lac	15%
Grade of parasitemia	Mild (<5%)	48%
	Moderate (5-10%)	27%
	Severe (>10%)	17%

Leucocytosis or leucopenia is seen in complicated malaria either due to malarial parasites or other bacterial or viral infections. In our study, platelet count less than 1 lac was present in 85% cases while platelet counts more than 1 lac in 15%. In our study mild parasitemia was present in 48%, moderate in 27% and severe in 17% of cases. Higher parasitemia indicates more severity. But even in mild parasitemia, complications are known to occur. It is an important prognostic marker.

Table 6: Complications in malaria

Complication	Present study (n=100)
Thrombocytopenia	85%
Jaundice	63%
Renal failure	44%
Anaemia	31%
Cerebral malaria	13%
Respiratory distress	13%
Hypoglycaemia	4%

In present study of complicated malaria the most common complication was thrombocytopenia 85% followed by jaundice 63% and ARF 44%.

Table 7: Cases of complicated malaria presented with ONE complication

Complication	No. of patients	Mortality
Thrombocytopenia	6	Nil
Renal failure	1	Nil
Jaundice	1	Nil
Cerebral Malaria	1	Nil

Out of 100 patients having complicated malaria with one complication, thrombocytopenia was most common present in 6 cases (66%)

Table 8: Cases of complicated malaria presented with two complications

Combination of Complication	No. of patients	Mortality
Jaundice + ARF	26	Nil
Jaundice + Anaemia	9	Nil
Anaemia + Thrombocytopenia	6	Nil
Cerebral Malaria + ARF	4	Nil
Thrombocytopenia + ARDS	3	1
Jaundice + ARDS	1	Nil
Anaemia + ARDS	1	Nil
ARF + Anaemia	1	Nil
Total	51	1

Out of 100 patients, 51% had two complications combination. The most common complication combination was Jaundice and ARF 26% (n=26) followed by Jaundice and Anaemia 9% (n=9).

Out of these 51 cases 98% (n=50) cases improved totally after treatment while 2% (n=1) cases having associated ARDS and Thrombocytopenia, expired despite of treatment.

Table 9: Cases of complicated malaria with three or more than three complications

Complication	No. of patients	Outcome	
		Cured	Expired
Jaundice + ARF + Thrombocytopenia	14	14	Nil
ARF + Jaundice + Anaemia	9	8	1
Cerebral malaria + Jaundice + ARF	4	3	1
Jaundice + Anaemia + Thrombocytopenia	4	4	Nil
Thrombocytopenia + ARDS + Jaundice	3	1	2
Thrombocytopenia + Anaemia + ARDS	2	1	1
Anaemia + Cerebral malaria + Thrombocytopenia	1	1	Nil
Cerebral Malaria + ARF + ARDS + Jaundice	3	Nil	3
Total	40	32	8

Out of 100 patients of complicated malaria 37% (n=37) had three complications combination.

The most common combination was jaundice, ARF and thrombocytopenia seen in 14% (n=14) followed by Jaundice, Anaemia and ARF in 9% (n=9).

Out of 100 patients 3% (n=3) had four complication combination having Cerebral Malaria + ARF + ARDS + Jaundice and all three of these patients expired despite of proper treatment.

In present study Artesunate was given in 98% cases while Quinine in 2% cases. We found artesunate to be a better drug in terms of tolerance and less side-effect.

Table 10: Proportion of deaths with different complications in present study

Complications	No. of patients	No. of deaths	Proportion of death
ARF + Jaundice + Anaemia	9	1	11%
Cerebral Malaria + Jaundice + ARF	4	1	25%
Thrombocytopenia + ARDS	3	1	33%
Thrombocytopenia + ARDS + Anaemia	2	1	50%
Thrombocytopenia + ARDS + Jaundice	3	2	66%
Cerebral Malaria + ARDS + Jaundice + ARF	3	3	100%
Total	24	9	37%

In our study total 9 cases expired despite of proper treatment, out of which 7 cases had ARDS as one of the components of complications. This shows that ARDS alone or as a combined complication is prognostically worst in complicated malaria. 2 cases in present study that expired were having three combinations of complications. Highest proportion of death was seen in cerebral malaria, ARDS, ARF and Jaundice while least was in ARF, Jaundice and Anaemia.

Conclusion:

In present study of 100 patients of complicated malaria M: F ratio was 2:1. Maximum patients (50%) belonged to the age group of 21-40 years. The presenting symptoms were fever with rigor 90%, vomiting 60%, headache 40% and altered sensorium 23%. We found that haematological alterations were common including anaemia, leucopenia and thrombocytopenia. In present study 80% of patients were due to *P. Falciparum*, 15% were due to *P. Vivax* and remaining 5% were having mixed infections. Thus *P. Falciparum* was the major contributor for complicated cases. In present study, complications associated with malaria, in order of occurrence were Thrombocytopenia 85%, Jaundice 63%, Acute Renal Failure 44%, Anaemia 31%, cerebral malaria 13%, Respiratory distress 13% and Hypoglycaemia 4%. Out of 100 patients, 9% (n=9) cases presented with a single complication with no mortality, most common of which was thrombocytopenia (60%). 51% (n=51) cases presented with two complications in combination, of which Jaundice with ARF was most common 26% (n=26) cases. Out of these 51 cases, 2% (n=1) expired despite of proper treatment. In present study 40% (n=40) cases presented with three or more than three complications in combination, of which ARF, Jaundice and Thrombocytopenia was the most common, present in 14% (n=14) cases. Out of these 37 cases 86% (n=32) improved completely after treatment while 14% (n=5) cases expired despite of proper treatment. In present study 3% (n=3) cases presented with four complications combination. All had cerebral malaria, ARF, ARDS and Jaundice. All of them expired despite of proper treatment. Artesunate was given in 98% of cases while Quinine was given in 2% of cases. Artesunate was found to be a better drug in terms of tolerance and side effects while Quinine treated patients found to have side effects in the form of tinnitus, hypotension and impaired hearing which were reversible. ARDS in complicated malaria was prognostically the worst complication. In present study 13 cases were having ARDS along with other complications. 7 out of these 13 cases had died despite of proper treatment. This shows that ARDS alone or as combination complication is prognostically the worst in complicated malaria. We observed that more the combination of complication of malaria, more the chances of morbidity and mortality.

REFERENCES

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