Clinical Features, Diagnostic Techniques and Management of Dual Dengue and Malaria Infection

Amanullah Abbasi, Nazish Butt, Qurban Hussain Sheikh, Abdul Rabb Bhutto, S.M. Munir and Syed Masroor Ahmed

ABSTRACT

Objective: To find out clinical features, diagnostic techniques and management outcome of patients having dual dengue and malaria infection.

Study Design: A case series.

Place and Duration of Study: Medical Unit-III, Ward- 7, Jinnah Postgraduate Medical Centre, Karachi, from September 2007 to January 2008.

Methodology: Patients presented with fever of less than or equal to 10 days duration, severe body aches, rash and bleeding manifestations were included. Patients with obvious features of other diseases like typhoid, hereditary bleeding diathesis and hematological malignancies and only malarial parasite positive with high grade intermittent fever without rash and myalgia were excluded from the study. Diagnosis of dengue and malaria was based on history, clinical features, laboratory parameters and malarial parasite test by thin and thick films. Serological evaluation was done by dengue IgM and IgG by ELISA test kit.

Results: One hundred and fourteen patients were seen during the study period. Antibody titer (IgM) tested in all patients was found positive in 78 patients (69.64%). Among those 78 patients, 26 (23.21%) were concomitantly positive for malarial parasite (Group A). Plasmodium vivax was positive in 25 patients and falciparum in one patient. Fifty-two patients (46.42%) were dengue IgM positive and MP negative (Group B). Thirty four (30.35%) patients were MP and dengue IgM negative (Group C) but were strongly suspected for DHF and malaria on clinical and hematological basis. The hemoglobin of 34.61% of patients of group A, 5.76% of group B and 14.7% of group C were low, hematocrit level was also low in group A (92.3%), group B (15.38%) and group C (70.58%) patients. The platelet count was markedly low in 84.61% of patients of group A, 57.69% of group B and 94.11% of group C. Leukopenia was found in 34.61% of patients of group A, 78.84% in group B and 29.411% in group C. The liver function tests were deranged in all groups.

Conclusion: The frequency of dual dengue and malaria infection was 23.21%. The serology of the dengue and malaria showed negative results in 30.35%. The diagnosis of dual infections could be made on the basis of history, clinical examination supported by hematological results. It is recommended that all the patients suspected for dual infections should be treated concomitantly for dengue and malaria in malaria endemic areas.

Key words: Dengue. Malaria. Dual infection. Fever.
Although fever, retrobulbar headache, rash, myalgia and vomiting are the most frequent symptoms, it should be suspected if a patient meets the three diagnostic criterias of thrombocytopenia, hemoconcentration and elevated ALT and AST.  

The objective of this study was to find out clinical features, diagnostic techniques and management outcome of patients having dual dengue and malaria infection.

METHODOLOGY

A descriptive case series study was conducted from September 2007 to January 2008. Specific beds were assigned in Ward 7, Jinnah Postgraduate Medical Centre, Karachi for the studied group.

Patients presenting with fever of less than or equal to 10 days duration, severe body aches, rash and bleeding manifestations were included. Patients with obvious features of other diseases like typhoid, hereditary bleeding diathesis and hematological malignancies and the malarial parasite positive with high-grade intermittent fever without rash and myalgia were excluded from the study. Demographic data such as age, gender and residence, and epidemiological data such as exposure to mosquito bites were recorded. Detailed clinical history and examination were carried out and recorded in a performed proforma.

Complete blood count with peripheral film, malarial parasite thick and thin film stained with Giemsa stain, Prothrombin Time (PT), Activated Partial Thromboplastin Time (APTT), liver function test (LFT), dengue viral specific immunoglobulin detection (IgG, IgM), typhoid test and blood grouping and cross match.

Patients were divided into three groups. Group A was dengue IgM positive plus MP positive and combined clinical features. They were given parenteral fluid therapy according to WHO guidelines, paracetamol, and antimalarial therapy as quinine sulfate 600 mg thrice daily for 14 days in cases of Plasmodium falciparum, Coartem (artemether 20 mg, lumefantrine 120 mg) four tablets twice daily for 3 days, after which primaquine 0.6 mg/kg was given once a day for 14 days in cases of Plasmodium vivax; and platelet concentrates (platelet count <20,000x10^9/L), colloidal solutions and blood support in cases of circulatory failure. Group B was dengue IgM positive and MP negative with fever, body rash, myalgia and bleeding manifestations. They were given parenteral fluid therapy according to WHO guidelines, paracetamol, and platelet concentrates (in patients with platelet count of <20,000x10^9/L), colloidal solutions and blood support in cases of circulatory failure. Group C was dengue IgM negative and MP negative but had combined clinical features (intermittent prolonged fever, rash, myalgia, bleeding manifestation and anemia) of dengue and malaria. They were given antimalarial and parenteral fluid therapy, paracetamol, and platelet concentrates colloidal solutions and blood support in cases of circulatory failure.

The patients were discharged after 5-7 days when there was absence of fever for 24 hours, platelet count >50,000x10^9/L, good urine output and improvement in symptoms of vomiting, anorexia and abdominal pain.

Data were processed and analyzed with SPSS for Windows software version 12.0.

RESULTS

During the study period, 114 patients met the inclusion criteria. Two patients were excluded from the study, one patient suffered from acute leukemia and other from malaria. Eighty two patients were male and 30 were female. The age varied from 13 years to 70 years with the mean of 41.5 years. The symptoms and clinical findings are stated in the Table I. Laboratory findings of probable and proven dual dengue and malaria patients are summarized in Table II. Antibody titer (IgM) tested in all patients was found positive in 78 patients (69.64%). Among those 78 patients, 26 (23.21%) were concomitantly positive for malarial parasite (Group A). Plasmodium vivax was positive in 25 patients and falciparum in one patient. Fifty two patients (46.42%) were dengue IgM positive and MP negative (Group B). Thirty four (30.35%) patients were MP and dengue IgM negative (Group C) but were strongly suspected for DHF and malaria on clinical basis. The hemoglobin level of 34.61% of patients of group A, 5.76% of group B and 14.77% of group C were low. The hematocrit (Hct) level was also low in 84.61% of patients of group A, 57.69% of group B and 94.11% of group C. The leukopenia was found in 70.588% patients. The platelet count was markedly low in 84.61% of patients of group A, 57.69% of group B and 94.11% of group C. The leukopenia was found in 34.61% of patients of group A, 78.84% in group B and 29.411% in group C. The liver function tests were deranged in all groups.

![Table I: Common symptoms and clinical findings (n=112).](image)

Patients with bleeding manifestation and platelet count < 20,000x10^9 without bleeding was transfused with a
mean 6 units of 50 ml of platelets. Patients who had Hct of < 20% were transfused with 2 units of 200 ml red cells (4 patients). The symptoms were resolved in 4 days, except fever, which was prolonged in patients with dual infection. The average stay in the hospital was 6 days.

**DISCUSSION**

The emergence of DHF is becoming a public health problem in Karachi. The expansion of this *flavivirus* infection is linked to resurgence of the mosquito vector *Aedes aegypti*, population growth, uncontrolled urbanization and overcrowding without appropriate water and waste management, and global spread of dengue via travel and trade.29 Pakistan is located on the endemic belt of malaria, and the incidence is one case per thousand population.20 Dual infections are not uncommon in malaria.21 It would be expected that coexisting malaria and dengue infection would be common in areas where both illnesses are endemic. Dual infections with two infectious agents can result in an illness having overlapping symptoms, resulting in a situation where both diagnosis and treatment of a patient may become difficult for a physician. The patients with combined infection had prolonged fever of more than 7 days, myalgias, bleeding manifestations, rash and anemia. Patients with dengue infection had high-grade continuous fever lasting for 3-7 days duration, myalgia, rash, bleeding manifestation, hepatomegaly, raised hematocrit, thrombocytopenia, elevated ALT and AST.18,22

Similarly, malaria produces fever, headache, malaise, abdominal discomfort; vomiting and other flu like symptoms, but rash is not the characteristic feature of malaria.1 Complicated *falciparum* malaria can produce altered level of consciousness, renal failure, hypotensive shock, pulmonary edema, abdominal pain with diarrhea, hepatosplenomegaly, spontaneous bleeding and coagu-lopathy, hyper-pyrexia and unarousable coma.23 Differentiating malaria from dengue, based on purely clinical grounds is difficult. Compared with those with malaria, patients with dengue are more likely to develop abrupt onset of fever, with severe headache, myalgias and arthralgias (severe pain gives it the name of break bone fever), and rashes.24

The hematocrit and hemoglobin level was low in group A and C patients as compared to group B. The platelet count was markedly low in both groups A and C as compared to group B. Hematological abnormalities have been observed in patients with malaria, anemia and thrombocytopenia being the most common, but hemoconcentration may indicate dengue.25,26 The leukocyte count was markedly low in group B as compared to group A and C. Compared with other febrile illnesses, dengue fever is 18 times more likely if fever and leukocytosis are present, 71 times more likely if fever and rash are present, and 230 times more likely if fever, rash, and leukopenia are present.16

Severe thrombocytopenia is common in isolated *falciparum*, mixed *falciparum/vivax* malaria and in co-infection with dengue, but is very rare in isolated *P. vivax* infection.26 In this study, thrombocytopenia was found in all patients, but markedly low in patients with dual dengue and malaria infection. The liver function tests were deranged in all groups. Although, liver is not the target organ of dengue virus, several pathological findings including fatty change, centrilobular necrosis and monocyte infiltration in the portal tract is reported.27,28 In the patients only positive for dengue IgM, and those not positive for dengue or malaria, one can not rule out the presence of dual infection. The IgM production varies considerably among the patients.
Some patients will have IgM detectable by the 2nd to the 4th day after the beginning of the symptoms, while others do not develop detectable IgM until the 8th day after the disease onset. Some anti-dengue IgM false negative reactions are observed in secondary infection. A small percentage of patients have secondary infection with no detectable IgM antibodies. Similarly, the diagnosis of malaria by thick and thin films for malarial parasites has an operator dependent sensitivity of 80-90%. In experienced hands, microscopy can detect lower parasite counts and it is still considered the Gold standard test.

In the light of above results, prolonged fever with normal to low hematocrit and marked thrombocytopenia indicate dual infection. The clinical symptoms, signs and laboratory investigations of dengue IgM and MP positive compared with dengue IgM and MP negative patients were similar. The outcomes of patients treated for dual infection were good. Cases reported from France, India and Pakistan have shown that delayed diagnosis resulted in fatal complications. Therefore, treatment should be instituted to cover the dual infection.

CONCLUSION

The frequency of dual dengue and malaria infection was 23.21%. The serology of the dengue and malaria showed negative results in 30.35%. The diagnosis of dual infections should be made on the basis of history, clinical examination supported by hematological results. Therefore, it is recommended that all the patients suspected for dual infections should be treated concomitantly for dengue and malaria in malaria endemic areas.

REFERENCES


.....∗.....