ABSTRACT

Objective: to characterize the hospitalized cases of dengue fever during an epidemic in a tertiary hospital. Method: cross-sectional study based on secondary data collected between September 2006 and August 2007, the medical files of a public hospital, tertiary education, linked to the Unified Health Service (SUS). The sample consisted of selection population whose inclusion criteria were the definition of dengue, dengue hemorrhagic fever and dengue with complications. The research project had a favorable opinion by the Ethics in Research Committee, CAAE 11706412.3.0000.5537. Results: of 247 cases, the most common was dengue complications with 156 (63.2%), followed by hemorrhagic fever with 68 (27.5%). Predominantly female, with an average stay of 14 days and was discharged in 242 (98.0%) cases. The main symptoms were fever in 184 (74.5%), myalgia 176 (71.3%) and headache 156 (63.2%). Conclusion: strategies should be adopted to prevent respiratory disease, which featured a large public health problem. Descriptors: Dengue; Neglected Diseases; Epidemiology.

RESUMO

Objetivo: caracterizar os casos internados de dengue durante epidemia em um hospital terciário. Método: estudo transversal, com base de dados secundários, coletados entre setembro de 2006 a agosto de 2007, no serviço de arquivo médico de um hospital de ensino público, terciário, vinculado ao Sistema Único de Saúde. A amostra foi composta por seleção da população cujos critérios de inclusão foram os de definição de casos de dengue, dengue hemorrágica e dengue com complicações. O projeto de pesquisa teve o parecer favorável pelo Comitê de Ética em Pesquisa, CAAE 11706412.3.0000.5537. Resultados: dos 247 casos, o mais comum foi de dengue com complicações com 156 (63,2%), seguidos de febre hemorrágica com 68 (27,5%). Predominantemente do sexo feminino, com média de permanência de 14 dias e alta hospitalar em 242 (98,0%) casos. As principais manifestações foram febre em 184 casos (74,5%), malária 176 (71,3%) e cefaleia 156 (63,2%). Conclusão: estratégias devem ser adotadas para prevenção do adoecimento, que caracterizaram um grande problema de saúde pública. Descritores: Dengue; Doenças Negligenciadas; Epidemiologia.

RESUMEN

Objetivo: caracterizar los casos hospitalizados por dengue durante una epidemia en un hospital de tercer nivel. Método: estudio transversal basado en los datos secundarios recogidos entre septiembre de 2006 y agosto de 2007, los archivos médicos de un hospital público, la educación terciaria, vinculados al Sistema Único de Salud. La muestra consistió en la selección de población cuyos criterios de inclusión fueron la definición de dengue, el dengue hemorrágico y el dengue con complicaciones. El proyecto de investigación tiene una opinión favorable del Comité de Ética en Investigación, CAAE 11706412.3.0000.5537. Resultados: de los 247 casos, fueron más comunes los de dengue con complicaciones con 156 (63,2%), seguido de fiebre hemorrágica con 68 (27,5%). Predominantemente mujeres, con una estancia media de 14 días y fue dado de alta en 242 (98,0%) casos. Los principales síntomas fueron fiebre en 184 casos (74,5%), malaria 176 (71,3%) y dolor de cabeza 156 (63,2%). Conclusión: las estrategias deben adoptarse para prevenir la enfermedad respiratoria, que contó con un gran problema de salud pública. Descritores: Dengue; Las Enfermedades Desatendidas; Epidemiología.
INTRODUCTION

Dengue is considered among the most important vector-borne viruses. It occurs when the individual is bitten by the female mosquito Aedes aegypti, which require a blood meal for egg maturation and propagation of the species.¹

According to the literature, about two-fifths of the world population live in areas at risk for dengue transmission, more than two billion six hundred million people.² Since 1997, approximately 500,000 new cases of hemorrhagic dengue were registered worldwide.³

The dengue virus belongs to the family Flaviviridae, genus Flavivirus, which presents the serotypes: DEN-1, DEN-2, DEN-3 and DEN-4.⁴ The four serotypes are serologically related, but antigenically distinct, permanent homologous to heterologous immunity and transient.³

Clinical manifestations range from asymptomatic to an undifferentiated fever to dengue hemorrhagic fever (DHF)/Dengue Shock Syndrome (DSS) infection.⁴

The DEN-1 serotype was introduced in Brazil by the state of Rio de Janeiro in 1986 when it acquired epidemiological importance and the first cases of DHF/DSS were presented.³ From this, successive epidemic waves occurred when it was isolated DEN-2 in 1989.⁶

In the state of Mato Grosso do Sul (MS), dengue was isolated in 1987, with the introduction of serotype DEN-1 and, in 1990, with light and self-limited cases. In 1996, DEN-2 virus was isolated, with recurrence of this in 2001 and isolation of DEN-3. In the summer of 2007, the Midwest region was classified as the area of highest incidence rate of dengue cases by DEN-3 in the country, with 827 cases per 100,000 population. The state of Mato Grosso do Sul (MS) was the most affected region, with 74,902 cases and an incidence of 3,213 cases per 100,000 population. The state capital, Campo Grande, recorded the highest number of cases, with 45,843 affected and of these, 108 cases finalized as DHF/DSS.⁷

A large increase in the number of cases was observed in the first months of 2010, a total of 1,110.99% (31,510) in the Midwest region, when compared to 2009 (2,602)⁹. This situation mobilized joint actions that led to reduction in cases despite the circulation of serotypes DEN-1, DEN-2 and DEN-3. However, in 2012, new epidemic occurred with simultaneous movement of DEN-1, DEN-2 and DHN virus.⁴ Thus, due to the relevance of the subject, this study aims to:

- To characterized the clinical and epidemiological hospitalized dengue cases during an epidemic at a tertiary hospital.

METHOD

Article drawn from the dissertation <<clinical and epidemiological characterization of patients hospitalized with dengue in a tertiary hospital in Campo Grande - MS>> defended at the Midwest Graduate Program in Health and Development in the Region, School of Medicine Doctor Hélio Mandetta of the Federal University of Mato Grosso do Sul/UFMS. Campo Grande/MS, Brazil 2010.

This is a cross-sectional study, using secondary data obtained through review of medical records of patients admitted with epidemiological and laboratory diagnosis of dengue cases admitted to a tertiary hospital, public school, a SUS Campo Grande/MS. Data were collected from August 2006 to September 2007, in the medical archive service which was a reference to the treatment of dengue cases in MS during this epidemic.

The population consisted of all cases admitted to the service and the study period with a diagnosis of dengue confirmed. The sample consisted of selecting population after application of inclusion/exclusion listed.

The inclusion in the survey was conducted through the records that met the criteria for defining cases of dengue, dengue hemorrhagic fever and dengue with complications, as recommended by the Ministry of Health¹⁰, which were laboratory confirmed by the Central Public Health Laboratory of MS and Municipal Central Laboratory of Campo Grande.

The clinical and laboratory records that did not meet the inclusion criteria or those who did not have complete data were excluded.

The results of the variables in this study were statistically evaluated according to the recommended methods (mean, standard deviation, percentages and ANOVA test) and are presented in tables, by statistical analysis as the “Software” SPSS, version 13.0¹⁶.

The research protocol was approved by the Ethics Committee on Human Research of the Federal University of Mato Grosso do Sul, under protocol number 1441/2009, CAAE number 11706412.3.0000.5537.
RESULTS

The number of registered cases diagnosed with dengue fever in hospital admission during the period was 270, of which 23 were discarded as exclusion criteria, with the ultimate universe Search 247 records.

When the records were submitted to the classification, 23/247 (9.3%) concluded the case as Classical Dengue (CD), 156/247 (63.2%) with Dengue complications (DCC) and 68/247 (27.5 %) Dengue Hemorrhagic Fever/Dengue Shock Syndrome (DHF/DSS).

When analyzed according to sex, 130/247 (52.6%) were female and 117/247 (47.4%) males (adults and children).

The age distribution of affected individuals ranged from six to 90 years old, with mean age of 36.65 ± 19.14 years old, with a prevalence of 187/247 (75.7%) patients between 15 and 60 years old.

Among children and adolescents up to 14 years old, 24/247 (9.8%) of the total evolved with compatible clinical forms of CD 2/23 (8.7%), DCC 16/156 (10.3%) and 6/68 (8.8%) classified as DHF/ DSS.

In the adult population, 187/247 (75.7%) had dengue, classified as CD 15/23 (65.2%) cases, DCC in 112/156 (71.8%) and DHF/DSS in 59/68 (86.7%).

Among the elderly population, 35/247 (14.2%) were affected by dengue, of these, 5/23 (21.7%) were classified as CD, 27/156 (17.3%) as DCC and 3/68 (4.4%) with DHF/DSS (Table 1).

As for days of hospitalization, there was a variation between one and 27 (mean time of 4.38 ± 2.62 days) to the final outcome, however, when classified as CD, DCC and FHD variant was between one and 11 (mean hospitalization 3.70 ± 1.99), one to 14 (mean hospital stay 4.24 ± 1.99), 2:27 (average 4.94 ± 3.73 admission) days, respectively.

In comparing the groups with respect to length of stay, there was no significant difference between them (one-way ANOVA test, p = 0.08).

The outcome of admissions was analyzed according to the classification of cases with hospital discharge in 242 (98.0%) cases, the high order in 2/242 (0.8%), hospital avoidance in 2/242 (0.8%) and death in 1/242 (0.4%).

The municipality of Campo Grande/MS was responsible for 229 (92.7%) cases coming from other cities in the state. The main clinical manifestations were fever 184/247 (74.5%); myalgia 176/247 (71.3%) and headache 156/247 (63.2%).

When we analyzed spontaneous hemorrhagic manifestation variable among the subjects of the study, the most frequent clinical findings were petechiae with 74/247 (30.0%) and gum bleeding 28/247 (11.3%) (Table 2).

Table 1. Clinical dengue rating, according to sex and age of the cases. Campo Grande / MS - 2007.

<table>
<thead>
<tr>
<th>Variables</th>
<th>DC (n=23)</th>
<th>DCC (n=156)</th>
<th>FHD/SC (n=68)</th>
<th>Total (n=247)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dengue Classification</td>
<td>23</td>
<td>156</td>
<td>68</td>
<td>247</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>82</td>
<td>37</td>
<td>130</td>
</tr>
<tr>
<td>Male</td>
<td>12</td>
<td>74</td>
<td>31</td>
<td>117</td>
</tr>
<tr>
<td>Average ± Desvio padrão da média / Standard deviation</td>
<td>42,83±5,70</td>
<td>40,68±1,99</td>
<td>31,08±2,07</td>
<td>36,65±19,14</td>
</tr>
<tr>
<td>Age (n=23)</td>
<td>DCC (n=156)</td>
<td>FHD/SC (n=68)</td>
<td>Total (n=247)</td>
<td></td>
</tr>
<tr>
<td>From 15 to 20</td>
<td>4</td>
<td>14</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>From 21 to 40</td>
<td>11</td>
<td>56</td>
<td>30</td>
<td>97</td>
</tr>
<tr>
<td>From 41 to 60</td>
<td>1</td>
<td>42</td>
<td>17</td>
<td>60</td>
</tr>
<tr>
<td>More than 60</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

CD=Classic Dengue; DCC=Dengue with complications; DHF=Dengue hemorrhagic fever.
Warning signals were observed in 83/247 (33.6%) cases, among which stood abdominal pain in 67/83 cases (80.7%), hepatomegaly in 15/83 (18%) and cavity effusion in 1/247 cases. Campo Grande / MS - 2007.

In 72/247 (29.1%) studied records, cases of dengue associated comorbidities (chronic diseases) were found when 9/23 (39.1%) were classified as CD, 49/156 (31.4%) as DCC and 14/68 (20.6%) DHF/SDH.

Comorbidities in this study were stratified by systems in which 62/72 (86.1%) had changes in the cardiovascular system, systemic arterial hypertension (SAH), the most prevalent with 44/62 (71%) cases, the disease then comorbidities by the endocrine system, these appeared in 11/72 (15.3%) cases, with emphasis on the presence of Diabetes Mellitus with 10/72 (13.9%) cases. The comorbidities related to other causes were found in 10/72 (13.9%), with the sequel of stroke recorded in 6/72 (6.9%) (Table 3).

When analyzed laboratory tests in 212/247 (85%) of cases the examination of hematocrit more than once was performed during hospitalization, when there was a variation between the highest and lowest value of 26.40 and 54.50% (average of 41.73 ± 4.87%).

On 24/212 (11.32%) of cases, blood-concentration was described, of which 3/15 (20%) 13/137 (9.48%) and 8/60 (13.3%) patients were classified as CD, DCC and DHF/DSS, respectively. When observed laboratory tests as the result of higher hematocrit was obtained numerically 48.9%, 54.50%, 51.60% consecutively.

The platelet count ranged from 1,000 to 224,000 g/dl (mean value ± 54555.92 32808.79 g/dl). The measurement of albumin was performed in 149/247 (60%) cases, and the results varied between 0.90 and 6.70 g/dl (mean value ± 4.32 ± 0.54 g/dl), with more significant changes in 137/247 (91%) patients who developed severe forms of dengue.

Liver enzymes alanine aminotransferase (ALT) and aspartate aminotransferase (AST)
were evaluated in 179/247 (72.46%) cases and showed results ranging between 22.00 and 694.00 g/dl (mean value of 140.43 ± 114.71) and that these changes mainly observed among cases classified as DCC.

When we analyzed IgM serology, 125/247 (50.6%) cases were positive spread between classifications: CD with 9/23 (39.1%), DCC with 67/156 (42.9%) and cases of DHF/DSS attended with 49/68 (72.1%). Still 2/247 (0.8%) as indeterminate results were finalized and 120/247 (48.6%) cases the examination was not found.

Clinical complications of dengue were detected in 17 cases, with involvement of significant ways and systems have been reported in the medical record confirmed for complications from the disease (Table 4).

<table>
<thead>
<tr>
<th>Variables</th>
<th>DCC*(n=156)</th>
<th>DHF/DSS** (n=68)</th>
<th>Total (n=247)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>143</td>
<td>65</td>
<td>230</td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>4</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Respiratory</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Circulatory</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Nervous</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Integumentary</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*DCC=Dengue with complications; DHF**=Dengue hemorrhagic fever/Dengue Shock Syndrome.

**DISCUSSION**

In this study, cases of dengue had found minority of 23 (9.3%) among those classified as CD, which differs from the Brazilian trend until the year 2007, possibly because of cases requiring hospitalization, focus of this study which is not very common in the classical framework. Other 156 (63.2%) cases presenting with DCC, in agreement with that observed in Brazil in the year 2008. Since 68 (27.5%) were classified as DHF/DSS, as in a study conducted in Mexico. Such numbers must take into account the multiplicity of variables employed by the criteria established by the Ministry of Health (2005), which leads to difficulty in closing and classification of cases and cause to be underestimated.

Regarding the slight predominance of females, studies conducted in Rio de Janeiro and Colombia have also observed this characteristic, with a male-female ratio of 0.69:1 and 0.8:1, respectively. Study in Singapore found the opposite, when there was a lower incidence among women. Another study found more cases in males in some populations from different regions of Brazil, however, was not representative for the total Brazilian population infection. Sex was not different between cases of dengue infection.

When evaluating separately the age groups most affected by the disease, some authors conclude that this cannot be considered a factor associated with more severe forms of dengue, it can vary between regions, different epidemics and the studied period. In some cases it was possible to correlate the strain and virulence binomial exposure of susceptible individual and the possibility of underreporting by difficult access to health services.

In this study, it was observed that working-age adults were more bouts in the same way that studies in the Americas, Nicaragua and Brazil, however, different from that carried out in Asia, where there was a predominance of pediatric and severe forms of the disease, a fact also observed in another Brazilian study.

When analyzed the total days of hospitalization, found an average of 14 days and 98.0% (n = 242) for high resolution of the case in this study. A study of Vietnam cites an average hospital stay of seven days (minimum of three and maximum of 11 days); another held in Campo Grande - MS found an average of ten days, these, over 90% of cases were discharged.

In Brazil, the mortality rate in the period 1998-2002 was 5.4%. In Recife, the 2002 epidemic, 18 deaths among 208 cases of DHF/DSS were therefore recorded a mortality rate of 5.2%.

In this study, only one progressed to DHF/DSS (0.04%), this lethality below the world average, which is less than 1% in cases of DHF/DSS, the fact that according to the Ministry of Health is due to coordinated actions between health departments in the state and municipality, in the care of patients with dengue, which provide quick access to services, support diagnosis and appropriate clinical management.

Regarding dengue hemorrhagic manifestations, the tourniquet test (induced...
The blood-concentration occurs not only by capillary leakage but also by dehydration caused by vomiting, low fluid intake, inadequate fluid replacement or hyperthermia. These factors lead to bleeding associated with hypotension and progression to severity among patients, then, it is characterized as a differentiating factor among patients with DC of DHF/DSS and contributes to death. 4

Epidemiological and clinical aspects of cases...

In this sample, an average of 54,000 cel/UL platelets was found, ranging 1000-224000 cel./UL among the cases were cured and average of 42,000 cel./UL in case of death. During dengue infection, platelets were found below the expected 70-80% of cases, resulting in a bone marrow suppression. In the chaos of DHF/DSS, thrombocytopenia is justified by peripheral destruction and/or increased consumption of this blood element. 24

Capillary permeability is also assessed by low serum albumin level, especially when presented below the reference range (3.5 to 5.5 g/dl), it allows the largest amount of notification of cases of dengue. 15,25,6 This study found that patients with DCC and FHD showed a serum albumin level less than those who progressed with the milder form the same way as another study that evaluated hepatic abnormalities in dengue cases. 27

A study that evaluated adults with dengue found 63.4% of changes in dosages of aspartate aminotransferase (AST) and alanine aminotransferase in 45% (ALT). This concluded that the elevation of transaminases and reactive hepatitis are common complications in patients infected with the dengue virus. 28 Another Thai study also identified elevated transaminase levels in 29% of patients with dengue CD and 91% of cases of DHF/DSS. 22

In patients undergoing dosages of AST and ALT, the sample showed an increase of greater than ten times the normal values. The same was found in studies that also detected a prevalence of elevated AST over ALT, a fact that justifies the presence of AST in other organs such as heart, striated muscle, kidney and pancreas. In ALT is predominantly in the kidney, liver and heart. 22,27,29

In Chinese study, ALT levels (> 100U/ml) were significantly (p <0.05) higher in cases of DHF/DSS (33.5%) than in CD cases (16.3%) when these levels tended to normalize their values 14-21 dias. 30 Elevated transaminases in some cases is due to overuse of acetaminophen, which is the drug of choice, with therapeutic intent to symptomatology. 26

É preconizado pelo Ministério da Saúde a coleta de sorologia para IgM em 10% da população com suspeita de dengue e 100% dos casos suspeitos para FHD/SCD durante epidemias. 16 Neste estudo 48,6% dos casos não realizaram a sorologia, por não ter sido feita o pedido ou coleta no período indicado, que levou a uma falha na vigilância epidemiológica para fechamento dos casos de FHD/SCD.

It is recommended by the Ministry of Health to collect IgM serology in 10% of the population with suspected dengue and 100% of
suspected cases to DHF / DSS during epidemics. In this study 48.6% of the cases did not perform serology for not request or collect have been made in the stated period, which led to a failure to close surveillance of cases of DHF / DSS.

Few studies have correlated the presence of comorbidities with severe forms of dengue, because they are patients who require special clinical monitoring. The Ministry of Health cites the underlying diseases such as hypertension, diabetes mellitus, bronchial asthma, chronic hematologic or renal disease, severe cardiovascular disease, acid-peptic disease or autoimmune comorbidities as more common during the onset of dengue. In a study that analyzed 644 confirmed cases of dengue, 412 characterized as CD and 232 as DHF/DSS, the most common comorbidities were DM and HAS.

**CONCLUSION**

The epidemiology of dengue among patients in this study, points among 247 confirmed cases that most developed some complication of the classic symptoms, however obtained admission into the world and low lethality average.

The general clinical manifestations most frequent in all classifications of dengue indicated consecutively: fever, myalgia and headache. Among the laboratory tests, it was found in most cases hematocrit below 20%, regardless of age studied.

We conclude that the inability to control dengue is a global phenomenon, so it is imperative that it be given information regarding the company and its epidemiological characteristics, clinical laboratory, in addition to the ongoing training of health professionals to act not only in the forms curative, but in preventing emphatically.

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Corresponding Address
Marcos Antonio Ferreira Júnior
Programa de Pós-graduação em Enfermagem
Centro de Ciências da Saúde
Universidade Federal do Rio Grande do Norte
Av. Senador Salgado Filho, s/n - Campus Lagoa Nova
CEP 59072-970 – Natal (RN), Brazil