ORIGINAL ARTICLE

RETROSPECTIVE STUDY ON NEONATES OF DENGUE POSITIVE MOTHER OVER A PERIOD OF ONE YEAR

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Abstract

Objectives: This is a retrospective study in which all neonates with confirmed dengue fever mother admitted to our special care nursery from March 2014 to March 2015 were recruited. This is to determine the percentage of positive dengue serology in the neonates of mother with confirmed dengue fever and to investigate the correlation between the duration of maternal illness with these neonatal seropositivity of dengue antibody and their presenting symptoms. Method: A total of 22 neonates whose mother with confirmed dengue fever were recruited out of which 14 (63.6%) neonates of confirmed dengue fever mothers had positive dengue serology. Results: Eight out of fourteen neonates were dengue seropositive when mother dengue illness was between day 1 to 5 of illness (acute phase) at the time of delivery. Thirteen out of twenty-two neonates (59%) were symptomatic, out of which 61.5% (8 out of 13) were delivered during maternal acute phase of illness. Conclusion: From this study, we concluded that neonates were more likely to be dengue seropositive and symptomatic when mother presented in acute phase of illness during delivery. However, our sample size was small, only 22 neonates were recruited from a single centre, therefore a larger sample size from multicentre is required in future.

Keywords: Neonatal Dengue, Dengue, Neonatal

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Introduction

Dengue is a result of dengue virus infection, an RNA virus (flavivirus), transmitted by Aedes aegypti mosquitoes [1]. Infection by any one of the 4 recognized serotype does not confer immunity to the other three [1]. Prior infection by one serotype (primary dengue) predisposes a person to more severe infection manifestations by other serotypes (secondary dengue) [2]. With infections rising to epidemic proportions, even pregnant women alike are not spared thus giving rise to increasing perinatal transmission of dengue fever [3]. Maternal dengue results in increased maternal mortality, low birth weights, preterm delivery, neonatal admissions and fetal death. Neonatal infection give rise to a spectrum of outcomes ranging from
asymptomatic to death [4,5].

This study aimed to determine the percentage of positive dengue serology (Dengue NS-1 or IgM) amongst neonates of mother with confirmed dengue fever (positive Dengue NS-1 or IgM), diagnosed in Hospital Tengku Ampuan Rahimah (HTAR), Klang from March 2014 to March 2015; and to investigate the correlation between the duration of maternal illness with symptoms of neonatal infection and seropositive test results.

Methodology

An observational study was carried out whereby, 22 neonates of mothers with confirmed dengue (positive Dengue NS-1 or IgM), admitted to our special care nursery in HTAR, Klang, from March 2014 to March 2015, were recruited and reviewed in retrospect. Data was collected and analyzed.

Results

A total of 22 neonates of mothers with confirmed dengue fever were recruited. Fourteen out of twenty-two neonates (63.6%) were tested positive, as shown in Table 1.

Table 1. Positive dengue serology in neonates of mothers with confirmed dengue fever

<table>
<thead>
<tr>
<th>Dengue serology</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>8</td>
<td>36.4</td>
</tr>
<tr>
<td>Positive</td>
<td>14</td>
<td>63.6</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 1. Percentage of positive dengue serology in neonates of mother with confirmed dengue fever
Table 2. Common presenting symptoms in neonates of mothers with dengue fever

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>4</td>
<td>18.2</td>
</tr>
<tr>
<td>Thrombocytopenia</td>
<td>6</td>
<td>27.3</td>
</tr>
<tr>
<td>Fever and thrombocytopenia</td>
<td>3</td>
<td>13.6</td>
</tr>
<tr>
<td>Renal and liver involvement</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No Symptoms</td>
<td>9</td>
<td>40.9</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 2. Presenting symptoms in neonates of mother with dengue fever

Thirteen out of twenty-two neonates (59.1%) were symptomatic. Most common presenting symptoms were fever, thrombocytopenia or fever with thrombocytopenia, which accounts for 18.2%, 27.3% and 13.6% respectively (Figure 2 and Table 2).
Figure 3. Seropositive results in relation with maternal days of illness during delivery

Out of 14 neonates who tested positive, 8 (36.3%) were delivered to mothers at acute phase (day 1 to day 5 of illness) (Figure 3).

Figure 4. Percentage of symptomatic cases during different phases of maternal dengue

From Figure 4, out of the total 22 neonates, 36.3% of the neonates born by mother during acute phase of illness were symptomatic; as compared to those who were born by mother at recovery phase of dengue and those who had previous infection, only 4.5% were symptomatic respectively.

Only one neonate within the acute phase group remained asymptomatic (4.5%).
A majority of those who were symptomatic, 8 out of 13 (61.5%), were from the group presenting during acute phase of maternal illness (Figure 5).

Discussion

In this study, the type of dengue serology tests that were done for mothers and neonates were by NS-1 or IgM ELISA method.

The higher percentages of neonates who were seropositive, were in keeping with the increasing numbers of vertical transmission, as a result from the emergence of the dengue epidemic.

Of all known presentation of dengue, there is no significant renal or liver impairment noted in our study group (Table 2). This may be due in part to the small sample size involved which may not reflect the true
presentation within the general population or due to the difference in the virulence of the strain involved.

As shown in Figure 3, those delivered to mothers with prior infections, were more likely to be seropositive from maternal transplacental dengue antibodies (IgG) [6,7]. A majority presented within acute phase of maternal infection reflecting the greater risk of vertical transmission during this period of maternal illness where viral load is at its peak (viraemic phase) [6,7].

Figure 7. Course of Dengue Illness

Two cases from the recovery group and later phase of illness were symptomatic. This could be due to neonatal pyrexia following maternal postpartum fever, which reflects postnatal sepsis rather than dengue itself (Figure 4).

Those neonates born within the acute phase of maternal illness were more likely to present with symptoms probably due to the lack of attenuation from transplacental maternal antibodies. Neonates of mothers in later stages of illness or having prior infection may have had intrauterine infection and already entered recovery phase upon delivery and are thus asymptomatic [8].

The isolated case from the maternal acute phase group which remained asymptomatic was probably due to a milder maternal dengue infection or probably a primary dengue infection at presentation.

From previous observations, the time of acquiring dengue virus intrauterine could affect the fetus, whereby 2nd trimester infection could lead to premature labour and fetal death. Infection near, or at, term posed little effect on the infants [4,5]. The above adverse pregnancy outcomes reported was not seen in our present study. All neonates of different gestational ages had good outcome. However, one of the premature neonate had poor outcome and eventually died on day 8 of life. This may be due to extreme low birth weight and extreme prematurity which led to severe sepsis rather
than dengue itself (Figure 6).

These observations may not have reflected the true population presentation due to the small sample size of this study. A larger studies with larger sample sizes are necessary to demonstrate a more accurate observation and this can be achieved with multi-centered studies.

**Conclusion**

From this retrospective study, we can conclude that neonates of mothers who were dengue positive will be seropositive, due transplacental dengue antibodies transfer (IgG). They were also more likely to be dengue seropositive and symptomatic when born to mothers in acute phase of illness due to lack of immunoglobulin protection and peak levels of maternal viraemia. Therefore, neonates of mother with confirmed dengue fever should be admitted for closer monitoring, especially those delivered during maternal acute phase of dengue illness.

Studies with larger sample size from multiple centres are required in future to better illustrate the presentations and validate such findings with better accuracy.

**References**


