

Predictive Diagnostic Value of the Tourniquet Test for the Diagnosis of Dengue Infection in Pediatric Age Group Children

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Abstract: Background: Commercial available rapid diagnostic tests for the diagnosis of dengue infection are neither as sensitive nor specific as their manufacturer's claim. The Tourniquet test for diagnosis of dengue is simple, clinical which can be done at bed side. The tourniquet test is listed in the diagnostic criterion for dengue, dengue with warning signs and severe dengue. Methods: This is a hospital based observational study carried out in Narayana medical college and hospital during the period of August 2022 to October 2022. Methodology: Children < 18 years admitted with undifferentiated fever of <7 days with a clinical diagnosis of dengue infection are included in the study provided they gave informed written consent. On the day of admission, one of the investigators has taken the medical history, performed a physical examination and recorded the clinical details. The tourniquet test is then performed according to the standardised method (WHO 1997) within 24 hours of admission by the doctor. The age appropriate mercury sphygmomanometer cuff is used, to the mean of systolic and diastolic pressures for 5 minutes, on the contralateral side to venepuncture. An one inch square is marked using a ball point pen over the volar aspect of the forearm where the cuff is inflated. The observer counted the number of petechiae after removing the cuff at the end of 5 minutes, and the results are recorded. The tourniquet is considered positive when 10 or more petechiae are observed in the one inch square. Blood samples are sent for complete blood picture, liver function tests on the day of admission. Dengue serology for NS1 is sent on day 1 of admission. sample for IgG & IgM antibodies is sent on day 5 of illness for diagnosis of dengue fever. Result: Out of 50 patients admitted with clinically suspected dengue infection 36 are serologically confirmed (73%), remaining 14 are serologically negative (27%). Among these 14, scrub typhus is seen in 7 (50%), typhoid fever in 3 (21.4%), Henoch schonlein purpura in 1 (7.14%), and unknown in 3 (21.4%). Tourniquet test is positive in 13 cases (26%), 11 (30.5%) among serology positive cases and 2 (22.2%) in seronegative each cases. In seropositive patients 2 with Dengue fever and 9 with Dengue hemorrhagic fever are positive for Tourniquet test. Inter - observer agreement for the Tourniquet test is 90%. The sensitivity of the Tourniquet test is 30.55% and its specificity is 85.71%. The positive predictive value is 84.61% and negative predictive value is 32.43%. Conclusion: A positive tourniquet test suggests dengue and that treatment of alternative diagnoses may not be needed. A negative test result does not exclude dengue. Admission tourniquet test has low sensitivity hence has low value in the diagnosis of dengue infection in Paediatric age group children.

Keywords: Dengue fever, Dengue hemorrhagic fever, tourniquet test, diagnosis, Paediatric age group.

1. Introduction

Dengue infection is an increasing public health problem in tropical and subtropical countries. Dengue fever is characterised by sudden onset of high - grade fever with non - specific symptoms, and most cases resolve without specific treatment. Dengue hemorrhagic fever is characterised by increased vascular permeability and may progress to hypovolemic shock and potentially lethal Dengue shock syndrome. The laboratory diagnosis of dengue is usually based on serological tests such as ELISA during the acute phase of infection which detect specific IgM or IgG antibodies and/or NS1 antigen with a fourfold rise in antibody titre in paired sera. as the commercially available tests are not as reliable as they claim to be, this study is being conducted to see the positive predictive value of the Tourniquet test in diagnosing Dengue infection.

1.1 Aim

To determine the Predictive diagnostic value of the tourniquet test in the diagnosis of dengue infection in Paediatric age group children.

1.2 Methods

This is a hospital based observational study carried out in Narayana medical college and hospital during the period of August 2022 to October 2022.

2. Methodology

Children < 18 years admitted with undifferentiated fever of <7 days with a clinical diagnosis of dengue infection are included in the study provided they gave informed written consent. On the day of admission, one of the investigators has taken the medical history, performed a physical examination and recorded the clinical details. The tourniquet test is then performed according to the standardised method (WHO 1997) within 24 hours of admission by the doctor.

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The age appropriate mercury sphygmomanometer cuff is used, to the mean of systolic and diastolic pressures for 5 minutes, on the contralateral side to venepuncture. An one inch square is marked using a ball point pen over the volar aspect of the forearm where the cuff is inflated. The observer counted the number of petechiae after removing the cuff at the end of 5 minutes, and the results are recorded. The tourniquet is considered positive when 10 or more petechiae are observed in the one inch square. Blood samples are sent for complete blood picture, liver function tests on the day of admission. Dengue serology for NS1 is sent on day 1 of admission. sample for IgG & IgM antibodies is sent on day 5 of illness for diagnosis of dengue fever.

Inclusion Criteria:

- Children < 18 years of age with undifferentiated fever < 7 days
- Who have given consent for the study

Exclusion criteria:

- Children with undifferentiated fever > 7 days
- Children with fever with the possibility of other disease other than dengue infection.

Data Analysis

Baseline details and data are entered in MS Excel spreadsheet and analysis is done using SPSS version 22.0 Sensitivity, Specificity, PPV, NPV of the test is calculated.

3. Result

Out of 50 patients admitted with clinically suspected dengue infection 36 are serologically confirmed (73%), remaining 14 are serologically negative (27%). Among these 14, scrub typhus is seen in 7 (50%), typhoid fever in 3 (21.4%), Henoch schonlein purpura in 1 (7.14%), and unknown in 3 (21.4%). Tourniquet test is positive in 13 cases (26%), 11 (30.5%) among serology positive cases and 2 (22.2%) in seronegative each cases. In seropositive patients 2 with Dengue fever and 9 with Dengue hemorrhagic fever are positive for Tourniquet test. Inter - observer agreement for the Tourniquet test is 90%. The sensitivity of the Tourniquet test is 30.55% and its specificity is 85.71%. The positive predictive value is 84.61% and negative predictive value is 32.43%.

4. Conclusion

A positive tourniquet test suggests dengue and that treatment of alternative diagnoses may not be needed. A negative test result does not exclude dengue. Admission tourniquet test has low sensitivity hence has low value in the diagnosis of dengue infection in Paediatric age group children.

Conflict of interest: None declared

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Ethical approval: The study was approved by the Institutional Ethical committee on 22/10/2022

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