



ORIGINAL ARTICLE

Predictors of Dengue Shock Syndrome: APTT Elevation as a Risk Factor in Children with Dengue Fever

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Summary

A retrospective study was conducted to investigate the risk factors in dengue cases admitted from 2005 to 2010 in Tawau Hospital, Sabah. A total of 732 cases admitted as suspected dengue were analysed and out of it 203 patients were found to be positive for dengue serology. Clinical and Laboratory data's were collected and analysed for the risk factors. In our observation over period of time we found APTT was raised in most of the DHF/DSS. So want to see the significance of APTT as a risk factor. Out of the risk factors APPT was significantly raised more than the other risk factors. Not many studies are available on APPT. Our outcome denote APPT along with raised Haematocrit is very useful in early anticipating shock. APTT may be considered as a one of the risk factor to formulate risk score in dengue DHF and DSS.

Introduction

Dengue is one of a major problem throughout the Asia and other part of the world. Thailand is one of the endemic areas with multiple outbreaks. Annually 100 million cases [1,2] were affected and 500000 needs hospitalisation. About 95% are below 15 yrs. and shows the burden on Paediatric in health care delivery. In Malaysia Dengue is one of the illnesses that causes mortality Ministry of health is very much concerned about it, needing the formation of dengue management team in every hospital. As a result the case fatality rate has considerably reduced from 10% to in 1958 to 0.12% [3] the mortality was mainly from DHF 38% and DSS 62% [4] and there was no mortality in DF. In our study of 203 cases over a period of five years admitted from 2007 to 2010 were analysed and we have no death in the above period. In our obser-

vation and analysis result we found APTT is a useful risk predictor in predicting DSS. While searching the literature not many studies are available and we want give our results so that it may keep the ball rolling for further studies in other places.

Materials and Method

All the dengue and suspected dengue cases from Tawau, Kunak and Sempoorna were all referred to Paediatrics ward in Tawau Hospital for management. From 2005 till 2010 the case admitted in Tawau either suspected dengue or diagnosed dengue from our hospital data base was taken for the analysis. Data regarding the clinical presentation, Laboratory and clinical information and the results were analysed. A total of 732 patients were admitted as suspected dengue and out of it 203 were positive for serology as per WHO Guidelines were taken up for analysis. D1 Day of onset of fever symptom.

Based on WHO guidelines, positive serology and presence of classical symptoms are taken for the diagnosis. IgG IgM Confirmed Dengue cases were further classified as Dengue Fever DF and DHF (Dengue Haemorrhagic Fever) and DSS (Dengue Shock) Patients were admitted in High Dependency Unit and were monitored intensively for shock by Hourly BP, Pulse Rate, Strict Intake Output chart, Complete blood count and PT, APTT [5].

Result

A total of 732 cases admitted as suspected Dengue 203 cases were positive and were taken up for analysis.

Platelet count

All the 732 cases were admitted with Platelet count less than 100000/ul and fever without any focus sign of infection or any classical feature of other fevers. Out of this only 203 cases were positive for Dengue. Thrombocytopenia was observed in 56.4% of DF and in 55.5% in DSS and is present since D1 in DF and DSS/DHS. The above information shows that thrombocytopenia was not a very good risk predictor for DSS and DHF.

Leukopenia was seen in 34.9% in DF and 22.2% in DSS/DHF.

Neutropenia was seen in 26.1% in DF and 33.3% in DSS.

APTT Prolonged APTT (> 40 sec) was seen in 52.2% of DF and in 68.4% of DSS and an APTT was more than 60 sec in most of the DSS cases.

In DSS prolonged APTT was seen in 68.4% Thrombocytopenia was seen 55.6%, Neutropenia was seen in 33.3% and Leukopenia was seen in 22.2%, Dengue serology was positive only in 56.4% on D5 of illness and they become positive later only in rest of the cases.

Analysis of symptomatology like Vomiting, abdominal pain, joint pain, hepatomegaly, ascites and pleural effusion does not have significant association with DSS/DHF.

	DF	DSS
Total No. Patients 203	162 (79.80%)	41 (20.1%)
APTT	84 (51.85%)	26 (68.4%)
Thrombocytopenia	90 (56.4%)	21 (55.5%)
Leucopenia	56 (34.9%)	9 (22.2%)
Neutropenia	42 (26.1%)	12 (33.35%)

Discussion

Most of the times dengue has to be managed clinically, by clinical presentation with high index of suspicion since very often the serology was positive after 5 to 7 days of illness by the time most of the patient has recovered. So it may be mostly useful only either confirm or epidemiological point of view. So we have to rely upon the clinical skills and experience and involvement and close monitoring which need High Dependency or PICU beds which will burden the cost of health care delivery. So we need some reasonable predictor of risk factors so that it can be practiced in small hospitals and can be useful in identifying high risk case so that they can be referred to appropriate centres to prevent mortality at the same time reducing the cost, work load in referral hospitals.

The pathogenesis of Thrombocytopenia is poorly understood [6] Low platelet count of 40000/ul was [7] was associated with DSS The dengue serology was useful in confirming the dengue fever but was

not helping as predictor of risk factor which is essential to anticipate and treat the DSS and DHF. Low platelet count of 40000/ul was associated with DSS [7] but even low Platelet count was not correlating as predictor of DHF/DSS and useful in screening and treating guide in haemorrhagic patient only and not all the patients with low platelet counts shows signs of bleeding. Out of a total of 732 cases admitted with Platelet count less than 100000/ul only 203 cases were positive for Dengue. Thrombocytopenia was observed in 56.4% of DF and in 55.5% in DSS and is present since D1 in DF and DSS/DHS. The above information shows that thrombocytopenia was not a very good risk predictor for DSS and DHF though it is useful for screening.

A Haematocrit values has highly significant association with DHF/DSS, however clinical usefulness may be limited by the duration needed to observe the drop in haematocrit of more than 20%. Cao XT, et al. [8] median cut of value of haematocrit for DHF, in Vietnamese children, 48% Gomber S, et al. [9] in 2001 36.3% in Indian Children, CPG Guidelines Malaysia 47% for male and 40% female, increase in haematocrit value of more than 25% with platelet less than 40000/ul [7].

APTT and Prothrombin time are indicators of intrinsic and extrinsic pathway of coagulation. This can be caused by either by down regulation of synthesis of specific factors or by increase in consumption of specific factors. In dengue only APTT alone was prolonged, suggest the defect occurs in intrinsic pathway of coagulation. An unbalance between coagulation and fibrinolysis may cause Haemorrhage in DHF/DSS. Dengue viral infection induces the endothelial production of TPA as well as IL-6. IL 6 can down regulate the synthesis of coagulation factor XII the first factor to initiate the intrinsic pathway of coagulation. APTT prolongation in DHF patients caused by the deficiency of intrinsic pathway is probably due to impaired synthesis of coagulation factor XII. Chua MN teal advocated APTT of > 30 seconds to predicted for bleeding in DHF. Huan-Yao Lei, et al. [6] also reported there is a significance raise of APTT in DHF/DSS. HP Tee, et al. [10] reported low platelet level and prolonged APTT were significant association with bleeding tendencies. Ampaiwan, et al. [7] Prolongation of APTT, PT and TT (Thrombin Time) are predictors for DSS. In our patients PT was not raised significantly as observed by HP Tee, et al. [10], Chua, et al. [11] and Yao-Lei, et al. [6], however we did not do Thrombin Time with an aim of clinical management oriented so that it can practised widely in small hospitals also. APTT elevation was reported and advocated as an associated factor for disease severity (Wei Liu [12] observed an increase of APTT in 97.5% cases of DHF. Yng-Huey Huang [13], Jien-Wei Liu [12] observed an

increase of APTT in 97.5% cases of DHF). In our patients PT was not elevated significantly as observed by other studies... Patients with APPT more than 50 second were going for DSS needing more fluid.

Conclusion

APTT along with raised haematocrit should be taken as very significant useful predicting factors the DSS and DHF. APTT may be considered to formulate risk score in DHF and DSS. It may give a reliable, reasonable, and easily reproducible even in small hospitals.

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