

used to screen 1500 random samples for the presence RSV A/B and Adenovirus.

Results: The age of the subjects ranged from two months to 47 years, with a median of 35.7 months. One or more viruses were detected in 22.6% (340/1500) samples, with 51.2% (174/340) showing RSV (26.5% RSV A and 24.7% RSV B), while Adenovirus was 48.8% (166/340). There was a general prevalence of 15% for RSV during the months of June – August, in NRB, WEA and HLD regions, this prevalence being the highest during the study period. The NRB region showed a prevalence of 17.6% for Adeno which was the highest while the NEA region showed a prevalence of 6.4% which was the lowest for RSV during the study period.

Samples with dual viruses were 10.9% (37/340) and these were mainly RSV A with RSV B (16.2%), RSV A with Adenoviruses (46%) and RSV B with Adenoviruses (32.4%). Additionally, two samples from children aged 10 and 35 months had multiple infections with the three viruses.

Conclusion: A general prevalence of 11.6% for RSV and 11.06% for Adenoviruses was observed during the study period with highest prevalence of approximately 17% in the 5 zonal categories. Dual infection was of rare occurrence with a majority (5.4%) due to co-infection of any of the RSV infected subjects with Adenoviruses.

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Cardiac function and haemodynamics in Vietnamese patients with different dengue severity grades

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Background: Dengue continues to cause significant global morbidity and mortality. Severe disease is characterized by cardiovascular compromise from capillary leakage. Cardiac involvement in dengue has also been reported, but has not been adequately studied.

Methods: Setting: Hospital for Tropical Diseases, Ho Chi Minh City, Viet Nam.

Design: Seventy-nine patients aged 8–46 years with different dengue severity grades were studied using echocardiography including tissue Doppler imaging. The patients were split into severity grades: dengue, dengue with warning signs and severe dengue. Changes in cardiac functional parameters and haemodynamic indices were monitored over the hospital stay.

Results: Patients with severe dengue had worse cardiac function compared to dengue, in the form of left ventricular (LV) systolic dysfunction with increased Left myocardial performance index (LMPI) (0.58 (0.26–0.80) vs. 0.38 (0.22–0.70), $P=0.006$) (Table 1). Septal myocardial systolic velocities (S') were reduced, (6.4 (4.8–10) vs.

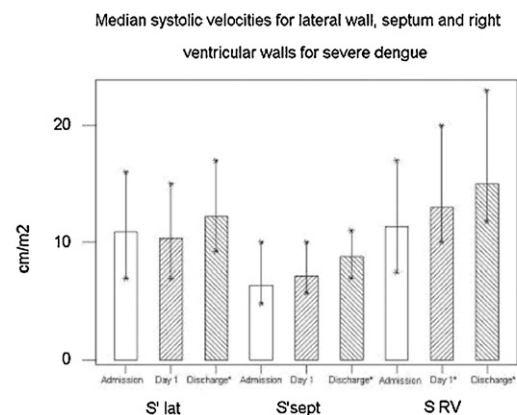
Table 1

Echocardiographic parameters by dengue grade at admission

n	Dengue 22	Dengue+42	p-value	Severe dengue 15	p-value
HR (b/min)	88 (62–110)	82 (50–105)	0.001	88 (58–115)	0.92
PP (mmHg)	40 (30–50)	40 (20–50)	0.99	30 (20–40)	0.011
SV (ml)	42.6 (23.2–61.5)	46.6 (19.0–75.1)	0.12	35.7 (25.9–59.5)	0.19
CO (l/min)	3.81 (2.15–5.39)	3.47 (1.98–6.76)	0.46	3.11 (1.87–5.21)	0.16
LVDd (cm)	4.17 (3.39–5.03)	4.29 (3.25–5.22)	0.28	4.10 (2.97–4.87)	1.00
EF (%)	68.8 (57.8–80.2)	67.8 (54.6–79.1)	0.60	66.0 (48.0–75.9)	0.095
S' lat (cm/s)	12.0 (9.0–16.5)	11.2 (7.0–18.0)	0.32	10.9 (7.0–16.0)	0.11
S' sept (cm/s)	8.1 (6.0–13.0)	8.0 (6.0–12.2)	0.43	6.4 (4.8–10.0)	0.010
S' RV (cm/s)	13.5 (10.0–17.0)	13.0 (9.0–22.0)	0.65	11.4 (7.5–17.0)	0.016
LMPI	0.14 (0.06–0.38)	0.23 (0.03–0.42)	0.006	0.17 (0.04–0.43)	0.18
LMPI	0.38 (0.22–0.70)	0.39 (0.21–0.67)	0.94	0.58 (0.26–0.80)	0.006
E' (cm/s)	17 (12–25)	17 (8–27)	0.33	13 (8–23)	0.0026
MAPSE (cm/s)	14.0 (11.0–18.9)	16.0 (10.0–20.0)	0.096	12.8 (9.0–17.0)	0.026
TAPSE (cm/s)	20.0 (14.0–26.0)	19.7 (13.0–29.0)	0.62	16.3 (10.5–24.0)	0.0089
IVCCI	46.79 (27.10–100)	49.03 (13.80–100)	0.86	56.25 (33.70–100)	0.19

Data is presented as median (minimum – maximum). P values correspond to differences between dengue with dengue +, and dengue with severe dengue using Mann-Whitney (non-parametric) tests.

HR=heart rate, PP=pulse pressure, CO=Cardiac Output, SV=stroke volume, LVDd=Left ventricular diastolic dimension, EF = Ejection fraction, LMPI and RMPI = Left and right myocardial performance index, S' lat, Sept, RV = myocardial systolic velocity of lateral wall, septum and right ventricle, MAPSE = Mitral, tricuspid annulus plane excursion, E' = Early diastolic mitral annular velocity, IVCCI = Inferior vena cava collapsibility Index



In severe dengue, systolic velocities were reduced at admission compared to discharge, most marked at the septal wall, ($P=0.002$).

* Indicates a significant difference between admission and the other time points.

Figure 1.

8.1 (6–13) cm/s, $P=0.01$) as well as right ventricular (RV) systolic (11.4 (7.5–17) vs. 13.5 (10–17) cm/s, $P=0.016$), (Figure 1) and diastolic (E') velocities (13 (8–23) vs. 17 (12–25) cm/s, $P=0.0026$). In the severe group, these parameters improved from hospital admission to discharge; septal S' to 8.8 (7–11) cm/s ($P=0.002$), RV S' to 15.0 (11.8–23) cm/s, ($P=0.003$) and diastolic velocity E' to 21 (11–25) cm/s ($P=0.002$). Patients with pleural effusions had worse cardiac function with higher LMPI (0.48 (0.26–0.8) vs. 0.39 (0.21–0.74), $P=0.01$) and lower LV lateral S' (10.8 (7–16) vs. 12.0 (7–18) cm/s, $P=0.02$) and RV S' (12.2 (7.5–17) vs. 13.5 (9.3–22) cm/s, $P=0.04$).

Conclusion: Dengue patients have evidence of systolic and diastolic myocardial impairment, with septal and right ventricular wall being predominantly affected. These changes are more common and pronounced in severe dengue and are associated with more significant pleural effusions. Echo screening should be considered for all severe dengue cases, to assess cardiac function and intravascular volume evaluation, in order to tailor their management.

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