

中文題目：成年重症登革熱病患的死亡風險因子分析

英文題目：Clinical characteristics and risk factors for mortality of adult patients with severe dengue

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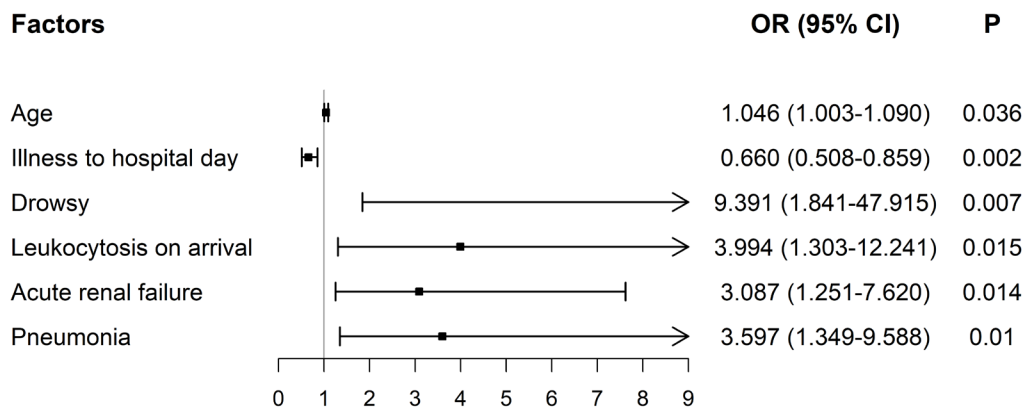
Background/Purpose: Dengue is a major public health problem in the tropics and subtropics worldwide. Early detection of severe dengue (SD) and appropriate management can reduce the case fatality rate from >20% to less than 1%. This study aimed to explore the clinical features of SD and determine the risk factors of mortality among SD patients.

Methods: We retrospectively included laboratory-confirmed adult patients (≥ 18 years old) with SD between 2002 and 2018, at Kaohsiung Chang Gung Memorial Hospital. We used univariable and multivariable logistic regression methods to investigate the risk factors associated with death.

Results: A total of 294 SD patients (median age, 67 years) were included in this study, of whom 203 (69%) were survived and 91(31%) died. Of 294 SD patients, acute kidney injury was found in 103 (35%) patients, pneumonia in 54 (18.4%) and bacteremia in 19 (6.5%). Of 286 patients with alanine aminotransferase (ALT) data available, 41 (14.3%) experienced fulminant hepatitis (ALT>1000U/L). The median time from illness onset to death of the 91 SD patients was 5 (range, 1~47) days. Multivariable regression showed increasing odds of death associated with older age (odds ratio [OR],1.046, 95% confidence interval [CI], 1.003-1.090; P = 0.036), altered consciousness (OR, 9.391, 95% CI, 1.841-47.915; P = 0.007), experienced acute kidney injury (OR, 3.087, 95% CI, 1.251-7.620; P = 0.014) and pneumonia (OR 3.597, 95% CI 1.349-9.588, P = 0.010), and leukocytosis at presentation (OR 3.994, 95% CI 1.303-12.241; P = 0.015). Early hospital arrival after illness onset was correlated with reduced mortality (OR, 0.660, 95% CI, 0.508-0.859; P = 0.002).

Conclusion: These potential risk factors could help clinicians to identify SD patients with poor prognosis. Our findings are valuable for clinicians in resource-limited countries for early prediction of mortality risk among SD patients and manage accordingly.

Figure. Multivariable regression of risk factors to mortality among severe dengue. *



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Supplemental table. Univariate of risk factors to mortality among severe dengue.

	Overall (N = 294)	Non-survivor (n = 91)	Survivor (n = 203)	P
Median age (range), years	67 (2-91)	70 (33-91)	66 (2-88)	0.092
Age > 65 years	201 (68)	65 (71)	136 (67)	0.450
Male	168 (57)	47 (51.6)	121 (59.6)	0.202
Comorbid condition				
Diabetes	117 (39)	43 (47)	74 (36.4)	0.080
Hypertension	188 (63)	59 (64.8)	129 (63.5)	0.832
Chronic kidney disease	60 (20.4)	23 (25.2)	37 (18.2)	0.166
End stage renal disease	21 (7)	8 (8.7)	13 (6.4)	0.462
Ischemic heart disease	41 (14)	15 (16.4)	26 (12.8)	0.400
Median time from illness onset to hospital presentation (range), day	2 (1~22)	2 (1~10)	3 (1-22)	0.001
Median time from illness onset to fatality (range), day	5 (2~47)	5 (1~47)	-	0.502
Dengue virus serotype				0.072
Serotype 1	6 (2)	3 (3.3)	3 (1.5)	
Serotype 2	273 (92.8)	87 (95.6)	186 (91.6)	
Serotype 3	15 (5.1)	1 (1.1)	14 (6.9)	

Symptoms and signs ≤ 48 hours after presentation				
Fever	227 (77.2)	72 (79.1)	155 (76.4)	0.601
Myalgia	63 (21.4)	21 (23)	42 (20.7)	0.645
Bone pain	56 (19)	18 (19.8)	38 (18.7)	0.830
Rash	35 (11.9)	5 (5.5)	30 (14.8)	0.023
Headache	52 (17.6)	18 (19.8)	34 (16.7)	0.529
Cough	50 (17)	26 (28.6)	24 (11.8)	0.000
Retro-orbital pain	7 (2.4)	2 (2.2)	5 (2.5)	0.890
Diarrhea	51 (17.3)	23 (25.3)	28 (13.8)	0.016
Petechiae	33 (11.2)	12 (13.2)	21 (10.3)	0.475
Warning signs ≤ 48 hours after presentation				
Abdomen pain	45 (15.3)	16(17.6%)	29(14.3%)	0.468
Vomiting	43 (14.6)	14(15.4%)	29(14.3%)	0.844
Drowsy	36 (12.2)	24(26.4%)	12(5.9%)	0.000
Mucosal bleed				
Gastrointestinal bleed	129 (43.9)	50 (54.9)	79 (38.9)	0.010
Hemoptysis	9 (3.1)	2 (2.2)	7 (3.45)	0.472
Gum bleed	14 (4.76)	5 (5.5)	9 (4.43)	0.693
Clinical fluid accumulation, no./total no. (%)				
Pleural effusion, no./total no.	51/276 (18.5)	21/91 (23)	30/185 (16.2)	0.167
Ascites, no./total no.	20/256 (7.8)	7/85 (8.2)	13/171 (7.6)	0.859
Laboratory data on the day of presentation				
Leukopenia (WBC < 3×10 ⁹ cells/L), no./total no. (%)	33/279 (11.8)	7/91 (7.8)	25/188 (13.3)	0.228
Leukocytosis (WBC > 10×10 ⁹ cells/L), no./total no. (%)	42/279 (15)	24/91 (23)	21/188 (11.2)	0.001
Median hemoglobin (range) (g/dL)	12.8 (4.2-19.9) (n = 277)	12.8 (6.5-18.1) (n = 89)	12.8 (4.26-19.9) (n = 186)	0.534
Median hematocrit (range) (%)	38 (12.6-64.5) (n = 275)	38 (13-54.9) (n = 89)	37.9 (12.6-64.5) (n = 186)	0.720
Median platelet count (range) (×10 ⁹ cells/L)	86.8 (0.3-501)	69 (0.3-378) (n = 91)	71 (0.7-501) (n = 189)	0.338

	(n = 280)			
Platelet count < 100 ×10 ⁹ cells/L, no./total no. (%)	174/280 (62.1)	57/91(62.6)	117/189(62)	0.732
Platelet count < 50 ×10 ⁹ cells/L, no./total no. (%)	119/280 (42.5)	40/91 (44)	79/189 (41.8)	0.833
Median AST (range) (IU/L)	141.5 (14-16001) (n = 244)	143 (16-16001) (n = 77)	141 (14-16001) (n = 167)	0.271
Median ALT (range) (IU/L)	418.56 (10-6366) (n = 251)	85 (10-6366) (n = 78)	77 (10-3348) (n = 173)	0.150
Median CRP (range) (mg/L)	51.44 (0.7-380.8) (n = 120)	35.4 (3.6-380.8) (n = 44)	28.7 (0.7-265.2) (n = 76)	0.230
Laboratory data during hospitalization				
Median WBC (WBC > 10×10 ⁹ cells/L)	13.5 (3.1-72.7) (n = 259)	14.8 (4.1-34.2) (n = 85)	13.4 (3.1-72.7) (n = 174)	0.318
Median highest hematocrit (range) (%)	40.1 (23-64.5) (n = 275)	40.8 (23-59) (n = 89)	39.9 (25.2-64.5) (n = 186)	0.652
Median nadir platelet count (range) (×10 ⁹ cells/L)	39.6 (3-376) (n = 278)	13 (3-303) (n = 90)	16.5 (3-376) (n = 188)	0.027
Median highest AST (range) (U/L)	1933.37 (10-36981) (n = 243)	2538 (14-36981) (n= 78)	129 (10-16001) (n = 165)	0.000
Median highest ALT (range) (U/L)	722.54 (10-19347) (n = 240)	1014 (10-19347) (n = 75)	85 (10-3348) (n = 165)	0.000
Median highest troponin-I (range) (ng/mL)	0.3 (0.01-80) (n = 88)	0.28 (0.01-80) (n = 50)	0.078 (0.01-464) (n = 38)	0.303
Median highest CPK (range) (U/L)	473 (19-31737) (n = 57)	627.5 (49-31737) (n = 30)	364 (19-103420) (n = 27)	0.677
Median highest lactate (range) (mg/dL)	25.85 (4.2-243)	29.8 (4.2-243)	13.8 (8.1-35.2)	0.012

	(n = 44)	(n = 35)	(n = 9)	
Complications during the entire clinical course				
Acute kidney injury	103 (35)	54(59.3)	49 (24.1)	0.000
Severe hepatitis (ALT >1000 IUL), no./total no. (%)	41/286 (14.3)	30/91(33)	11/195 (5.6)	0.000
Bacteremia	19(6.5)	10(11)	9(4.4)	0.062
Pneumonia	54 (18.4)	22 (24.4)	32 (15.7)	0.077
Rhabdomyolysis	15 (5.1)	8 (8.8)	7 (3.4)	0.054