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A novel nomogram of mortality prediction in geriatric emergency patients with dengue fever

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Background:

Dengue fever (DF) causes a higher mortality in geriatric patients (≥ 65 years) than in the younger patients. Because there is still no adequate method to predict mortality in the geriatric DF patients, we intended to develop a novel nomogram to clarify this issue.

Variable	All n = 627	With mortality n = 27	Without mortality n = 600	p-value†
Age (years)	74.09 ± 6.28	77.0 ± 7.45	73.95 ± 6.19	0.046
Age subgroup				
Young elderly (65–74 years)	353 (100)	11 (3.1)	342 (96.9)	0.056
Moderately elderly (75–84 years)	226 (100)	11 (4.9)	215 (95.1)	
Old elderly (≥85 years)	48 (100)	5 (10.4)	43 (89.6)	
Sex				
Female	329 (100)	14 (4.3)	315 (95.7)	>0.999
Male	298 (100)	13 (4.4)	285 (95.6)	
BMI > 30 (kg/m²)	23 (100)	0 (0)	23 (100)	0.52
Severe coma (GCS ≤ 8)	10 (100)	3 (30)	7 (70)	0.006
Hypotension (SBP < 90mmHg)	14 (100)	4 (28.6)	10 (71.4)	<0.001
HR (beat/min)	89.33 ± 19.05	88.67 ± 26.86	89.36 ± 18.66	0.895
BT > 39.5°C	625 (100)	26 (4.2)	599 (95.8)	0.15
Symptoms/signs				
Fever/chills	495 (100)	22 (4.4)	473 (95.6)	0.929
Muscle soreness	157 (100)	2 (1.3)	155 (98.7)	0.053
Joint pain	34 (100)	1 (2.9)	33 (97.1)	>0.999
Headache	93 (100)	3 (3.2)	90 (96.8)	0.784
Nausea/vomiting	147 (100)	8 (5.4)	139 (94.6)	0.587
Abdominal pain	94 (100)	3 (3.2)	91 (96.8)	0.784
Skin rash	28 (100)	3 (10.7)	25 (89.3)	0.114
Retro-orbital pain	4 (100)	1 (25)	3 (75)	0.162
Dyspnea	44 (100)	6 (13.6)	38 (86.4)	0.008
Ecchymosis/petechiae	11 (100)	1 (9.1)	10 (90.9)	0.386
Bleeding§	27 (100)	1 (3.7)	26 (96.3)	>0.999

Table 1. Demographic characteristics, vital signs, and symptoms/signs of all the geriatric patients with DF*

Variable	AOR (95% CI)	p-value*
Bedridden	8.90 (0.93, 64.36)	0.04
Severe hepatitis (AST > 1000 U/L)	53.19 (5.79, 691.21)	<0.001
Renal impairment (serum creatinine > 2 mg/dL)	7.20 (1.42, 37.63)	0.02

Table 3. Independent mortality predictors in geriatric DF patients by multivariate logistic regression analyses

Variable	All n = 627	With mortality n = 27	Without mortality n = 600	p-value†
Comorbidity				
Diabetes mellitus	220 (100)	15 (6.8)	205 (93.2)	0.038
Hypertension	395 (100)	19 (4.8)	376 (95.2)	0.544
Cancer	69 (100)	3 (4.3)	66 (95.7)	>0.999
Chronic kidney disease	58 (100)	11 (19)	47 (81)	<0.001
Coronary artery disease	88 (100)	8 (9.1)	80 (90.9)	0.040
Congestive heart failure	34 (100)	0 (0)	34 (100)	>0.999
Chronic obstructive pulmonary disease	28 (100)	1 (3.6)	27 (96.4)	>0.999
Stroke	64 (100)	1 (1.6)	63 (98.4)	0.509
Liver cirrhosis	3 (100)	0 (0)	3 (100)	>0.999
Pressure ulcer	65 (100)	1 (16.7)	5 (83.3)	0.233
Bedridden	13 (100)	3 (23.1)	10 (76.9)	0.015
Smoking	20 (100)	1 (5)	19 (95)	0.591
Alcoholism	16 (100)	1 (6.2)	15 (93.8)	0.510
Laboratory data				
WBC (cells/mm³)	67.68 ± 0.98	60.78 ± 7.02	67.99 ± 0.98	0.32
Anemia (hemoglobin < 10 g/dL)	46 (100)	5 (10.9)	41 (89.1)	0.04
Platelet < 100 10³/μL	275 (100)	17 (6.18)	258 (93.82)	0.071
Severe hepatitis (AST > 1000 U/L)	10 (100)	6 (60)	4 (40)	<0.001
ALT (U/L)	67.54 ± 206.6	348.08 ± 912.7	54.86 ± 67.89	0.114
hs-CRP (mg/L)	29.03 ± 46.75	75.81 ± 75.45	25.84 ± 42.48	0.008
Glucose (mg/dL)	161.01 ± 81.75	196 ± 133.36	159.32 ± 78.19	0.176
Renal impairment (serum creatinine > 2 mg/dL)	64 (100)	11 (17.2)	53 (82.8)	<0.001
Albumin < 3g/dL	27 (100)	7 (25.93)	20 (74.07)	0.18
PT (s)	11.9 ± 9.37	12.94 ± 4.36	11.8 ± 9.69	0.295
aPTT (s)	41.69 ± 21.66	68.59 ± 40.4	39.26 ± 17.28	0.002
Bacteremia	49 (100)	10 (20.4)	39 (79.6)	<0.001
Respiratory failure	6 (100)	5 (83.3)	1 (16.7)	<0.001
Decision group				
Group A	73 (100)	0 (0)	73 (100)	0.061
Group B	503 (100)	2 (0.3)	501 (99.7)	<0.001
Group C	50 (100)	24 (48.0)	26 (52.0)	<0.001

Table 2. Comparison of comorbidities, laboratory data, and decision groups in all the geriatric DF patients*

Methods :

We recruited 627 geriatric DF patients who visited the study hospital between September 1, 2015, and December 31, 2015 for this retrospective case-control study. Variables including demographic data, symptoms, signs, vital signs, comorbidities, laboratory data, and 30-day mortality were analyzed. Univariate analysis and multivariate logistic regression analysis were used to recognize independent mortality predictors, which were further combined to develop a nomogram for predicting death in this population.

Results:

The total mortality was 4.3% (27 patients died). The nomogram consisted three.

Discussion & Conclusions:

We developed a novel nomogram with user-friendly graphical interfaces which could generates the estimate to help predict mortality in geriatric DF patients. Further studies are warranted to validate its use.

Figure 1 A nomogram of mortality prediction in DF geriatric patients