



Detection of cerebrospinal fluid antibody in children with severe hand, food and mouth disease induced by enterovirus 71 infection and its clinical significance

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Abstract

the positive rate of anti-EV71 IgM in the fatal HFMD subgroup was 62.3% (33/53); the positive rate of anti-EV71 IgM in the severe HFMD subgroup was 59.8% (144/241). The CSF nucleated cells count and positive rates [105(56~180) ×10⁶ /L; 97.7%(173/177)] in antibody-positive subgroup were higher than those [62(30~150) ×10⁶ /L; 83.8%(98/117)] in antibody-negative subgroup (Z=3.663, p=0.000; χ²=19.089, p=0.000). The nucleated cells classification of the two subgroups showed statistical difference (t=2.343, P=0.020). And within the antibody-positive subgroup, the ratio of the patients with nucleated cells count higher than 100×10⁶ /L in fatal type group and severe type group was 69.7% (23/33) and 47.2% (68/144) respectively, and the two ratios showed statistical difference (χ²=5.429, P=0.02).

Objectives

To detect the anti-EV71 IgM level in cerebrospinal fluid (CSF) of children with severe hand, foot and mouth disease (HFMD) induced by enterovirus 71 (EV71) and then analyze the relationships among the IgM levels, CSF routine examination and patients' clinical features, and thus to evaluate the clinical significance of anti-EV71 IgM as a new indicator for early diagnosing children with severe HFMD induced by EV71.

Methods

- Viral RNA extraction and real time RT-PCR amplification
- Detection of IgM anti-EV71 in CSF

Table 1 Compare the positive of anti-EV71 IgM in 294 CSF samples of children with severe and fatal HFMD.

Group	anti-EV71 IgM of CSF samples	
	positive(n=177)	negative(n=117)
fatal (n=53)	33 (62.3%)	20 (37.3%)
severe (n=241)	144 (59.8%)	97 (40.2%)

Table 2 Relationship with anti-EV71 IgM levels and routine detection in CSF

Routine detection	Positive(n=177)	Negative (n=117)	T value	P
Age (years)	2.5±1.2	2.9±1.1	2.595	0.010
Sex (male/female)	116/61	74/43	0.161*	0.688
Nucleated cells (×10 ⁶ /L) M (Q1, Q3)	105(56~180)	62(30~150)	3.663 ^b	0.000
Abnormal nucleated cells [(%)]	173 (97.7)	98 (83.8)	19.089*	0.000
Nucleated cells classification (%)			2.343	0.020
mononuclear cell	(57±25)	(50±26)		
polykaryocyte cell	(43±25)	(50±26)		
Protein(mg/L) M (Q1, Q3)	366 (254.5~509.5)	331 (233~427.5)	2.158 ^b	0.031
Protein (>400 mg/L)	73 (41.2%)	32 (27.4%)	5.921*	0.015
Glucose (mmol/L) M (Q1, Q3)	3.6 (3.2~4.05)	3.6 (3.1~4.2)	0.371 ^b	0.711
Chloride ion (mmol/L) M (Q1, Q3)	124 (122~126)	124 (121.5~126)	0.682 ^b	0.495

Results

Table 3 Analyze clinical indexes between severe and fatal HFMD in positive anti-EV71 IgM of CSF.

Clinical indexes	Fatal (n=33)	Severe (n=144)	T value	P
Age (years)	1.9±0.7	2.6±1.2	3.150	0.002
Sex (male/female)	22/11	94/50	0.023*	0.880
Nucleated cells (×10 ⁶ /L) M (Q1, Q3)	130(48~212.5)	100(56.5~171.3)	1.283 ^b	0.200
Nucleated cells [(%)] (>100×10 ⁶ /L)	23 (69.7)	68 (47.2)	5.429*	0.020
Nucleated cells classification (%)			0.736	0.465
mononuclear cell	(54±26)	(58±25)		
polykaryocyte cell	(46±26)	(42±25)		
Protein(mg/L) M (Q1, Q3)	377 (251~491.5)	362.5 (258.3~510.3)	0.028 ^b	0.977
Protein (>400 mg/L)	13 (39.4%)	60 (41.71%)	0.057*	0.811
Glucose (mmol/L) M (Q1, Q3)	3.4 (3.2~4.0)	3.6 (3.2~4.1)	1.190 ^b	0.234
Chloride ion (mmol/L) M (Q1, Q3)	124 (120.5~125)	124 (122~126)	1.406 ^b	0.160

Conclusions

The anti-EV71 IgM levels in CSF can serve as an important indicator for early diagnosing children with severe HFMD induced by EV71. And the anti-EV71 IgM levels in CSF correlated to the CSF nucleated cells count and classification and CSF protein quantity. In the antibody-positive subgroup, the higher the nucleated cell count or the smaller the age, the higher the possibility of patients developing into fatal cases.

References

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