



Evaluation of serum cytokines and adhesion molecules as prognostic factors in patients with Crimean-Congo hemorrhagic fever



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Objectives

Crimean-Congo hemorrhagic fever (CCHF) virus causes an acute disease with the potential of a fatal outcome. The involvement of endothelium in CCHF have been explained by the theory that virus infection activates endothelial cells directly or indirectly via infected leukocytes and releases soluble mediators with concomitant activation of the endothelium. In this study, we have investigated adhesion molecules and cytokines levels in patients with CCHF.

Methods

This study included 51 patients with CCHF followed in our clinic during 2011-2012. Blood cell count, hemostasis and biochemical analysis were performed on admission. Serum samples were obtained from all patients on admission for analysis of cytokine and adhesion molecules and stored at -80°C . All the samples were studied simultaneously. CCHF viral antigen was studied by RT-PCR.

Serum cytokine levels (IL-6, IL-10, IL-12, IL-17, IL-23, TNF- α) and adhesion molecules (ICAM-1, VCAM-1) were measured by ELISA method. A patient was classified as having severe disease in the presence of any of the following findings: white blood cell $\geq 10 \times 10^9$ cells/L, platelet $\leq 20 \times 10^9$ /L, AST ≥ 900 U/L, ALT ≥ 700 U/L, aPTT ≥ 60 s, fibrinogen ≤ 110 mg/dl, somnolence or hemorrhage. Serum cytokine levels and adhesion molecules were compared between severe and non-severe and fatal and non-fatal cases.

Results

Fifty-one CCHF patients were included in this study. Of the patients, 29 were male (55.8%), mean age was 52.7 ± 13.5 years. Twenty patients (42.6%) revealed hemorrhagic signs such as epistaxis, petechia, ecchymosis, gingival bleeding, vaginal bleeding, hematemesis, and melana. Three patients died (5.8%).

The levels of ALT, AST, aPTT, IL-6, IL-10, IL-17, TNF- α , ICAM-1 and Caspase-3, were found to be high in patients with severe disease but only AST, aPTT, TNF- α and ICAM-1 levels were statistically significant (Table 1). There were statistically significant differences between fatal and non-fatal CCHF patients in terms of IL-17, ICAM-1, Caspase-3, aPTT, PT.

Conclusion

We found that AST, aPTT, TNF- α , ICAM-1 levels were higher in severe disease and IL-17, ICAM-1, Caspase-3, aPTT, PT in fatal disease. We think that these parameters could use to predict the prognosis of the patients with CCHF.

Table 1. The comparison of mean levels of laboratory parameters in patients

	Severe (n=12)	Non-severe (n=39)	p	Fatal (n=3)	Nonfatal (n=49)	p
Platelet	34833	53230	0.55	37666	49604	0.52
AST	1428	220	0.00	561	501	0.21
ALT	440	100	0.06	279	175	0.63
PT	15.4	12.4	0.23	23.7	12.4	0.02
aPTT	48	36.2	0.05	51.7	38.7	0.05
Fibrinogen	232	302	0.54	244	291	0.54
IL-6	42	21.3	0.18	43.5	25.2	0.14
IL-10	142	62	0.56	5	86	0.19
IL-12	8	8	0.68	9.3	8	0.79
IL-17	1.5	1.5	0.92	2.5	1.4	0.03
IL-23	0	1.5	0.42	0	1.2	0.72
TNF- α	127	70	0.01	136	80	0.42
Caspase-3	1.1	0.6	0.57	2.9	0.5	0.04
ICAM-1	33	23.7	0.04	14	8.7	0.04
VCAM-1	25	26	0.87	71	59	0.25

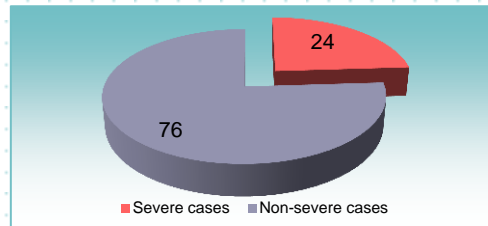


Figure 1. Severe and non-severe CCHF cases

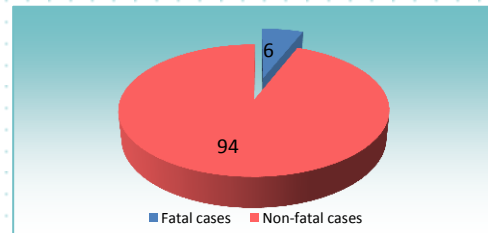


Figure 1. Fatal and non-fatal CCHF cases