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INTRODUCTION

The cytokine storm (CS) plays a crucial role in developing neurological complications associated with SARS-CoV-2 infection.

OBJECTIVES

To study the relationship between neurological manifestations and IL-6 levels in children with SARS-CoV-2 infection.

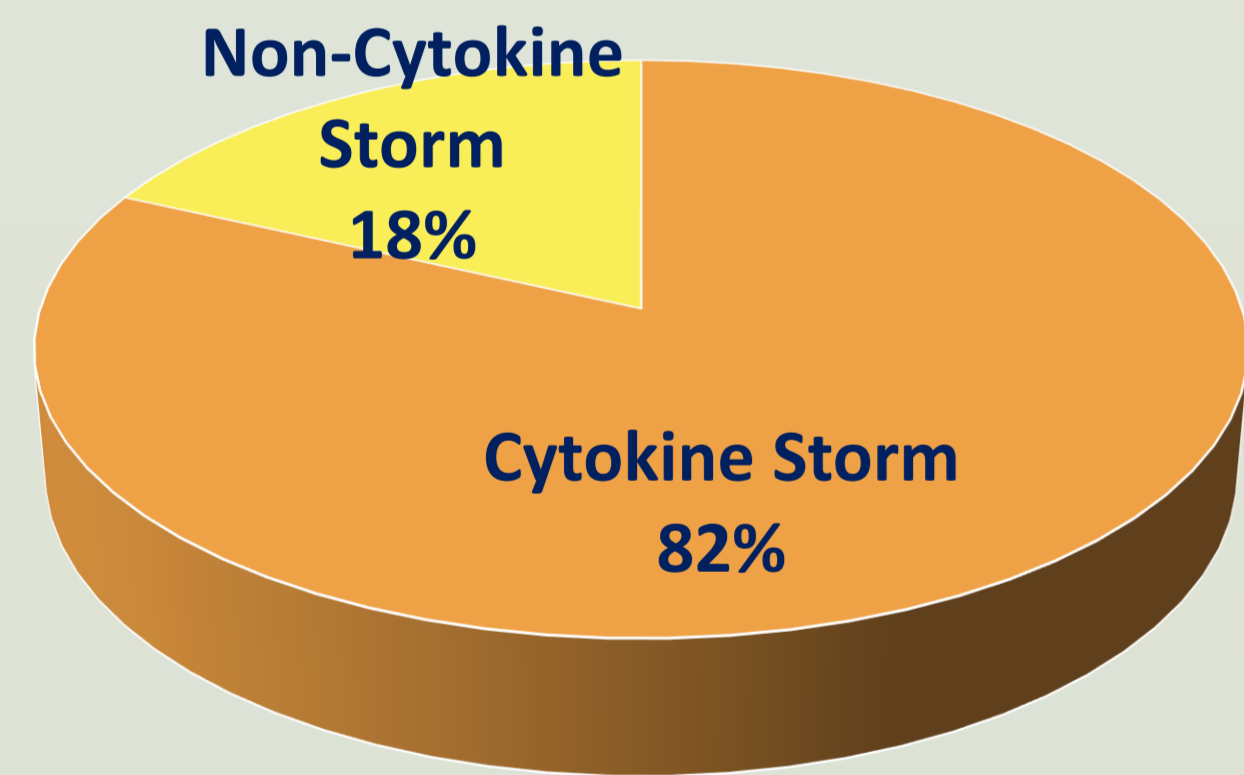


Fig. 1 Cytokines storm and Non-cytokines storm groups of SARS-CoV-2 infections

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MATERIALS & METHODS

The neurological symptoms associated with moderate and severe SARS-CoV-2 infection were analyzed in 88 children (age 29 days - 7 years), divided into two groups: with CS (the levels of inflammatory markers and interleukin-6 / IL-6) and non-CS.

Variables	Neuro-COVID-19 without CS (n = 72)	Neuro-COVID-19/ CS (n = 16)	p-value
Number of patients (%)	Number of patients (%)	Number of patients (%)	
Age	4.4 (29 days – 5 years)	5.9 (3 months – 7 years)	0.3887
Sex			
Male	53 (73,6%)	10 (62,5%)	
Female	19 (26,7%)	6 (37,5%)	0.5244
Clinical features			
Headache	14 (87,5%)	7 (9,7%)	0.0186
Miozitis	11 (42,8%)	3 (14,3%)	0.2800
Encephalopathy	69 (95,8%)	2 (12,5%)	<0.001
Seizures	12 (11%)	1 (6,2%)	0.0128
Ataxia	5 (31,25%)	1 (1,4%)	0.2474
Behavioral changes	2 (2,7%)	0 (0%)	0.2222
Elevated acute-phase reactants*	3 (18,7%)	16 (100%)	<0.001
IL-6	1 (6,2%)	16 (100%)	<0.001
Treatment			
Intensive care unit admission	1 (6,2%)	16 (100%)	<0.005
Duration of Hospitalization >7 days	3 (4,1%)	16 (100%)	<0.001
Corticosteroids	0 (0%)	16 (100%)	<0.001

Tab. 1 Neurological manifestations, investigations, treatment of patients with SARS-CoV-2

RESULTS

In the group with CS, 16 (18.2%; 95CI 14.09-22.31) cases were registered, and non-CS – 72 (81.8%; 95CI 77.69-85.91). Encephalopathy and seizures predominated in the CS group (81.3%; 95CI 71.54-91.06) compared to the non-CS group (8.3%; 95CI 5.04-11.56) (p: 0.001), where headache predominated (94.4%; 95CI 91.7-97.1), (p: 0.186). The number of patients requiring intensive care unit admission and corticosteroid treatment prevailed in the CS group (68.8%; 95CI 57.21-80.39) (p: 0.005 and p: 0.001), with a duration of hospitalization higher (81.25%) than in the non-CS group (9.7%), (p: 0.001). The values of C-reactive protein, ferritin, neutrophil-to-lymphocyte ratio, procalcitonin, D-dimers, and IL-6 were significantly increased in the CS group with a low lymphocyte count.

CONCLUSIONS

In the study conducted, one of the most common neurological presentation in CS patients is encephalopathy. Neurological manifestations in children with moderate and severe forms of SARS-CoV-2 (CS) are associated with significantly increased serum levels of IL-6 and other inflammatory markers compared to non-CS patients and have more rapid progression.

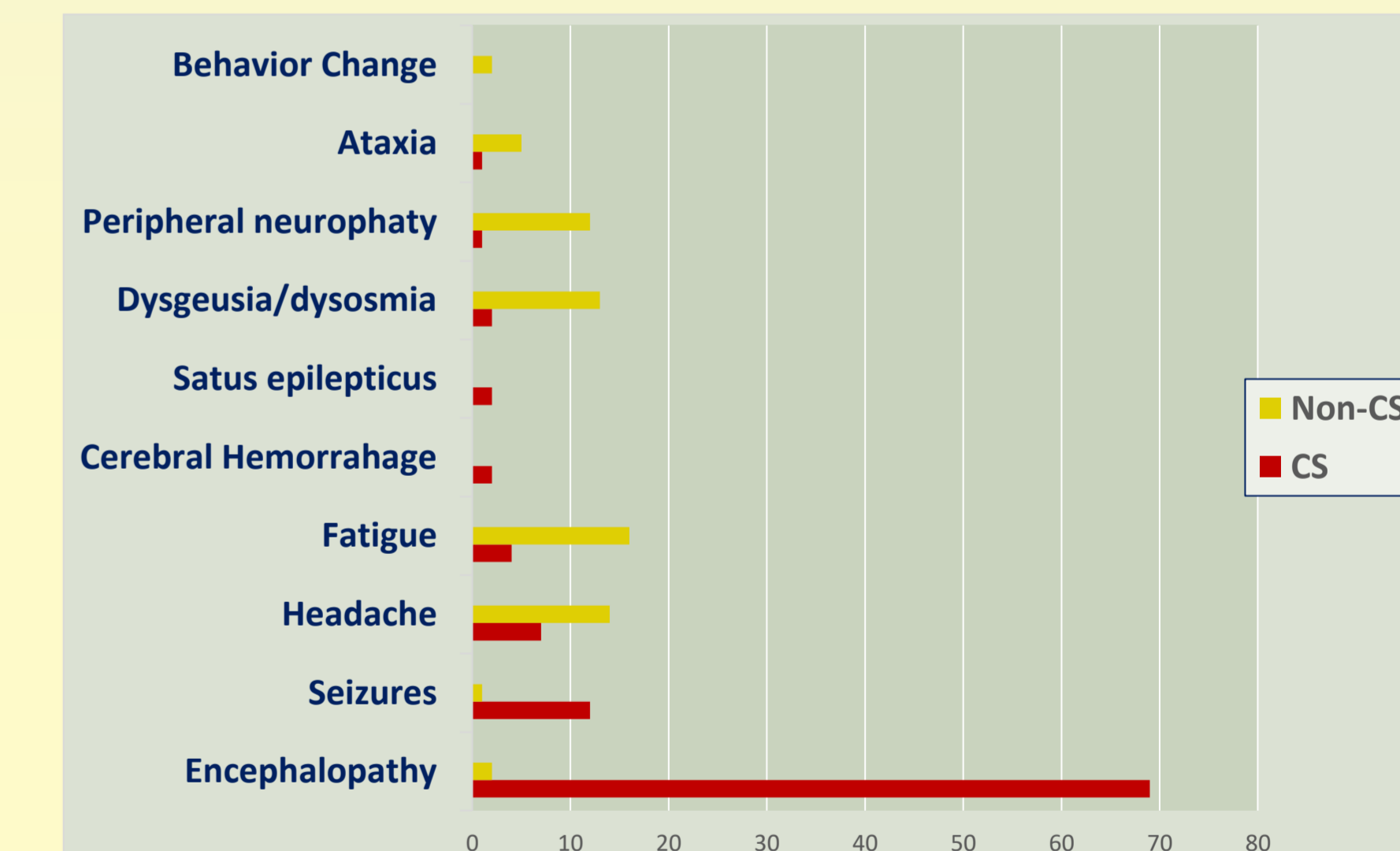


Fig. 2 Prevalence of neurological manifestations in SARS-CoV-2 (CS and Non-CS groups)

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