Title: The clinical and epidemiological features and hints of 82 confirmed COVID-19 pediatric cases aged 0-16 in Wuhan, China

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Abstract

Although COVID-19 pediatric patients just account for 1% of the overall cases, they are nonnegligible invisible infection sources. We quantitatively analyzed the clinical and epidemiological features of 82 confirmed cases aged 0-16 admitted to Wuhan Children's Hospital, which are expected to shed some lights onto the pediatric diagnosis and therapy.

Text

The outbreak of COVID-19 epidemic has attracted worldwide attentions since Dec., 2019, especially in Wuhan. The confirmed children just account for 1% of the overall confirmed cases. Although most of them have mild cases, they are still invisible infection sources of COVID-19 apt to be ignored. This study was carried out on Feb. 1-20, 2020 at Wuhan Children's Hospital, the sole designated hospital for COVID-19 children patients. The participants consisted of 813 children receiving COVID-19 nucleic acid detection. We obtained epidemiological, clinical laboratory, and outcome data. The study was approved by Wuhan Children's Hospital Ethics Committee, and official informed consent was obtained from guardians involved before enrollment when data were collected retrospectively.

Take throat-swab, anal-swab or urine specimens at admission, and implement real-time RT-PCR (Wuhan Huada Medical Technology Co., Ltd.). We described symptoms on admission; laboratory results; chest radiography and CT findings; treatment received for COVID-19 and clinical outcomes. Totally 812 children received COVID-19 nucleic acid detection. Therein, 82 (10.99 %) were infected with COVID-19. 74 (90.24%) had a history of exposure to confirmed or suspected family members. All the children lived in Wuhan.

As shown in Table 1, 51 boys and 31 girls were infected with COVID-19 with minimal and maximal ages being 3 days after birth and 16 years, respectively. Male infection rate (62.20%) is higher than female (37.8%), demonstrating the opposite to

[1]. Children over 6-age have the highest infection rate (42.68%). On admission, most had fever or cough. Most have mild clinical symptoms with 8 no symptoms. 8 critically ill cases was found with 4 children and 4 infants. On admission, leucocytes were above (resp. below) normal in 21 (25.61%) patients (resp. 4 (4.88%)). The percentage of lymphocytes were above (resp. below) normal range in 48 (58.54%) patients (resp. 16 (19.51%)). Activated partial thromboplastin time (APTT) were above (resp. below) normal range in 9 (9/49, 18.37%) patients (resp. 3 (3/49, 6.12%)). Albumin were below normal range in 30(36.59%). γ Glutamyl transpeptidase were above normal range in 27(32.93%). 30 (36.59%) had myocardial damage. Elevation of lactate dehydrogenase (LDH) in 15 (18.29%).

Regarding chest X-ray and CT, 30 (36.59%), 38 (46.34%) and 18 (21.95%) patients showed bilateral, unilateral, multiple mottling and groundglass opacity pneumonia, respectively. 1 (1.22%) was found pleural effusion occurred. 2 (2.44%) had normal chest CTs.

All patients were treated in isolation and interferon atomization therapy. Most were given antibiotic or antiviral treatment. 6 (6.10%) children received nasal catheter oxygen therapy. Only 8 was transferred to ICU and given intensive care. 3 had serious complications. Till Feb. 20, 60 (73.17%) patients had been discharged whereas others still in hospital. Two discharged. The mean hospital stay was 11.2 day.

From the clinical and treatment data collected in 82 hospitalized COVID-19 patients under 16-age, it surfaces that the juvenile case size is much smaller than the adult counterparts [2,3] due to milder symptoms. Accordingly, they are apt to be ignored as potential infection resources of COVID-19. The laboratory results and clue are highlighted below, which might be beneficial for diagnosis and therapy for pediatric patients.

Most patients had a history of exposure to COVID-19 pneumonia confirmed or suspected family members, and children over 6-age have the highest infection rate. Opposite to [1], male proportion is higher than female.

Most have fever or cough on admission. Most have mild symptoms.

Discharged rate is 73.17%. Mean hospital stay was 11.2 days. Zero death rate.

Among inspected clinical features, the most important indexes for COVID-19 are CT pneumonia, lymphocytes, APTT, Albumin, γ Glutamyl transpeptidase, LDH.

The study was limited to a small number of patients from a single center in Wuhan. Further studies from multiple centers on a larger cohort would be beneficial to further validate the proposed route as well as understand of the disease.

Table1: Clinical /laboratory features and treatment of 82 pediatric COVID-19 cases, in Wuhan

Age			
≤1month	3 (3.66%)	1month-6month	15 (18.29%)
7month-12month	7 (8.54%)	1year-3year	10 (12.20%)
3year-6year	12 (14.63%)	≥6year	35 (42.68%)
Sex			
Female	51 (62.20%)	Male	31 (37.80)
Clinical outcome			
Remained in hospital	22 (26.83%)	Discharged	60 (73.17%)
Signs and symptoms at admission			
Fever	14 (17.07%)	Cough	14 (17.07%)
Fever and couch	37 (45.12%)	Asymptomatic	8 (9.76%)
Fever with gastrointestinal reactions	7 (8.54%)		
Shortness of breath	2 (2.44%)		
Comorbid conditions			
Any	7 (8.54%)	ARDS	1 (1.22%)
Blood routine			
Leucocytes (× 10^9 per L; normal range 3.85-10)		8.76	
Increased	21 (25.61%)	Decreased	4 (4.88%)
Neutrophils%(normal range 20-55%)		42.00%	
Increased	36 (43.90%)	Decreased	10 (12.20%)
Lymphocytes%(normal range 25-40%)		59.67%	
Increased	48 (58.54%)	Decreased	16 (19.51%)
Platelets (normal range 100-320)		248	
Increased	11 (13.41%)	Decreased	1 (1.22%)
Haemoglobin (g/L; normal range 120-160)		125	
Increased	19 (23.17%)	Decreased	2 (2.44%)
Coagulation function			
Activated partial thromboplastin time (s; normal range 25.7-39)		38.2	
Increased	9 (18.37%)	Decreased	3 (6.12%)
normol	37 (75.51%)		
Prothrombin time(s; normal range 10.2-13.4)		10.82	
Increased	1 (2.04%)	Decreased	2 (4.08%)
normol	46 (95.83%)		
Blood biochemistry			
Albumin (g/L; normal range 39-53)		38.07	
Decreased		30 (36.59%)	
Glbumin(g/L; normal range 20-40)		15.33	
Decreased		42 (51.22%)	
Aspartate aminotransferase (U/L; normal range 10-40)		44.43	
Increased		23 (28.05%)	
Alanine aminotransferase (U/L; normal range 7-45)		34.57	
Increased		11 (13.41%)	

Comorbid conditions			
Respiratory failure	1 (1.22%)	Heart failure	1 (1.22%)
Non-infectious multiple organ dysfunction syndrome (MODS)		2 (2.44%)	
Septic shock	2 (2.44%)		
Chest x-ray and CT findings			
Unilateral pneumonia	38 (46.34%)	Bilateral pneumonia	30 (36.59%)
Multiple mottling and ground-glass opacity		18 (21.95%)	
Partial pulmonary consolidation		3 (3.61%)	
Pleural effusion	1 (1.22%)	Lung texture enhancement	12 (14.63%)
Treatment			
Oxygen inhaled through a nasal catheter		5 (6.10%)	
Mechanical ventilation			
Non-invasive	2 (2.44%)	Invasive	2 (2.44%)
Antibiotic treatment	70 (85.37%)	Antiviral treatment	82 (100%)
Glucocorticoids	3 (3.66%)	Blood purification	2 (2.44%)
Intravenous immunoglobulin therapy		3 (3.66%)	
Traditional Chinese medicine treatment		10 (12.20%)	
Blood biochemistry			
γ-Glutamyl transpeptidase (U/L; normal range 0-50)		64.97	
Increased		27 (32.93%)	
Blood urea nitrogen (mmol/L; normal range 2.9-7.1)		12.52	
Increased	19 (23.17%)	Decreased	6 (7.32%)
Serum creatinine (μmol/L; normal range 18-35)		16.13	
Increased	10(12.20%)	Decreased	46 (2.44%)
Creatine kinase-MB ((U/L; normal range 0-25)		65.78	
Increased		37 (45.12%)	
Lactate dehydrogenase (U/L; normal range 120-300)		194.7	
Increased		15 (18.29%)	
Infection-related biomarkers			
Procalcitonin (ng/mL; normal range 0·0–0.05)		1.47	
Increased		36 (43.90%)	
C-reactive protein (mg/L; normal range 0-3)		18.22	
Increased		23 (28.05%)	
Interleukin-6 (pg/mL; normal range 0-20.9)		30.66	
Increased		6 (17.14%)	
Interleukin-10 (pg/mL; normal range 0-5.9)		9.96	
Increased		13 (37.14%)	
Co-infection			
Syncytial virus	3 (8.75%)	influenza viruses	1 (4.35%)
CMV-IgM	2 (2.44%)	EB-IgM	2 (2.44%)
MP-Ab	17 (42.50%)	Adenovirus	1 (2.86%)
Bacteria	1 (1.22%)		

About the First Author

H. Yu is a diagnostic technician of the clinical laboratory in Wuhan Children's Hospital. Her research interest is diagnosis and therapy of pediatric infectious diseases.

Reference

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