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CLINICOPATHOLOGICAL CORRELATION AND OUTCOME IN COVID POSITIVE CHILDREN ADMITTED AT TERTIARY CARE CENTRE (A STUDY OF 65 CASE)

Paediatrics

Dr Niket Patel* 3rd Year Paediatric Resident *Corresponding Author

Dr Bhadresh Vyas Professor and Head, Paediatrics Dept

Dr Gunjali Shah 3rd Year Paediatric Resident

ABSTRACT

This is a Retrospective Prospective observational type of study carried out in the Covid-19 building of GGH hospital, Jamnagar from April 2021 to April 2022. Total 65 patients below 12 years of age were recruited in the study as per the inclusion and exclusion criteria. A questionnaire was used to gather information in the form of Demography data, clinical characteristics, pathological investigations, radiological studies, associated comorbid condition and outcome. Out of total 65 patients, the age group more commonly affected was 5-12 year(41.6%) followed by infant(29.2%) and 1-5 year age (29.2%). Fever(95%) was the most common symptom found in 62 out of 65 patients. 46(70%) presented with respiratory symptom and 22(33.8%) had non-respiratory symptoms. 6 patients (10%) had severe anaemia. 19 patients (29%) had abnormal x ray finding. 16 (27%) had oxygen requirement and of this 18, 12 (66%) required invasive ventilation.53 (81%) did not require any respiratory support. 12 (20%) required inotropic support. 16 (24%) had associated comorbidities. Out of the total, 12 patients (18%) expired and of them 10(83%) deaths were found in the ones with comorbidities, We could conclude that Children with comorbidities have a higher risk of severe COVID-19 infection and associated mortality than the children without underlying disease.

KEYWORDS

Covid-19 infection, comorbidity

INTRODUCTION

Coronavirus disease 2019(Covid-19) was first reported in Wuhan, China, in December 2019[1]. It is caused by severe acute respiratory syndrome coronavirus-2(SARS CoV-2). The first case in India was reported in an adult on 30th Jan 2020[2]. WHO declared Covid-19 a pandemic on 12th march 2020[2] .The clinical spectrum of the COVID-19 disease ranges from asymptomatic infection to mild respiratory tract infection to severe pneumonia with acute respiratory distress syndrome and multiorgan dysfunction. The paediatric population comprises of less than 5% of the total population affected in Covid-19[3]. This lower incidence rate among children may be attributable to children having fewer opportunities for exposures well as lower probability of them being tested. But still the proportion of pediatric patients may experience severe critical disease with significant morbidity and mortality. Relatively, little data are available relating to COVID-19 infection rates and related outcomes among children having any underlying pathological condition. The aim of the present study is to describe the clinical, epidemiological, pathological, management and outcome characteristics of paediatric patients infected with SARS-CoV2 and to better clarify the risk factors associated with severe covid 19 disease and mortality in children.

AIMS AND OBJECTIVES:

To study the clinical, pathological and radiological profile of the disease with it's outcome in the covid positive children.

To study the risk factors and assess the predictors of mortality in patients with severe covid disease.

MATERIAL AND METHOD:

This is a retrospective-prospective study conducted over a duration of 1 year from April 2021 to April 2022 at the Covid-19 building , Paediatrics ward, GGH, Jamnagar . Patients eligible for inclusion are those of 0-12 year with a confirmed covid 19 diagnosis through RTPCR or Rapid antigen test evaluated in inpatient basis. Ethical approval was obtained before inclusion. COVID-19 test, admission criteria and related investigations were conducted according to the protocol[4]. Detailed history was taken including the epidemiological data, basic demographic details, any pre existing medical condition, significant past, family or birth history and the immunisation history.

Lab tests including CBC, PT APTT INR, CRP, LDH, Ferritin, D-Dimer or any specific investigation when needed were collected.

The cut off for the parameters have been defined according to the standards[5]. Radiological investigations include Chest X-ray and USG chest were done. 2DECHO was done whenever required. Socioeconomic status of enrolled patients was determined using modified Kuppuswamy classification[6].

Following were the comorbidities present in our study:
IDDM-1, Congenital Heart Disease, Severe acute malnutrition, Down's syndrome, Non Hodkin's Lymphoma, Hypothyroidism, Chronic Renal Failure, Nephrotic syndrome, Rickets with multidysplastic Kidney, Neurological disorder .

Treatment related variables like respiratory support required, invasive/ non-invasive ventilation, inotropic support, nebulisation therapy, antibiotic or any other treatment given were noted.

Outcome associated variables like length of hospital stay, death/cure were recorded.Results were analysed using standard statistical tests. P value<0.05 was considered significant.

RESULTS:

Sociodemographic Profile:

Out of 65 patients, 39 (60%) were male and 26(40%) were female. The age group more commonly affected was 5-12 year(41.6%) followed by infant(29.2%) and 1-5 year age (29.2%). 59(90.7%) patients were completely immunised for age and 6 patients (9.3%) patients were partially immunised. According to the modified Kuppuswamy classification, 50.7% patients belong to lower middle class. Only 37(56.9%) patients had a contact history.

Table 1: Sociodemographic Profile Of Patients: (n=65)

Parameter		Frequency	Percentage
Gender	Male	39	60%
	Female	26	40%
Age group	0-1 year	19	29.2%
	1-5 year	19	29.2%
	5-12 year	27	41.6%
Routine Immunisation	Completely immunised	59	90.7%
	Partially immunised	6	9.3%
Socioeconomic class	Upper	0	0
	Upper middle	21	32.35
	Lower middle	33	50.7%
	Upper Lower	10	15.3%
	Lower	1	1.7%
Contact History	Yes	37	56.9%
	No	28	43.1%

Clinical Profile:

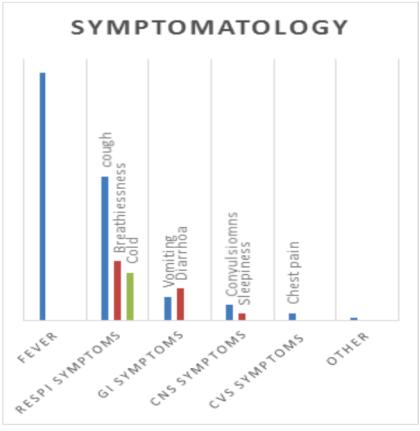
Fever was the predominant symptom found in (95%) patients followed by respiratory symptoms(70%) like cough, cold and breathlessness followed by GI related complaints (20%) like vomiting and diarrhoea

followed by CNS involvement(9%) like convulsion and excessive sleepiness followed by Cardiovascular involvement (3%) and other complaint (1%). Among the respiratory complaints, coughing was the most common presentation in 55% of patients followed by breathing difficulty (23%). Among the Gastrointestinal complaints, diarrhoea(12.3%) was more common than vomiting(9.2%). Among the CNS symptoms, patients presented with convulsion in 6.1% cases.

A study done by Kana Ram Jat[7], New Delhi, 2021 suggested that Fever(38.2%) was the most common presentation followed by respiratory symptoms(20%) followed by GI symptoms(<10%)

Table 2: Clinical Symptomatology Profile(n=65)

Symptoms	Number of patients	Percentage
Fever	62	95%
Respiratory symptoms	46	70%
Cough	36	55%
Cold	12	18.4%
Breathing difficulty	15	23%
GIT symptoms	13	20%
Vomiting	6	9.2%
Diarrhoea	8	12.3%
CNS symptoms	6	9%
Convulsions	4	6.1%
Sleepiness	2	3%
CVS symptoms (chest pain)	2	3%
Others	1	1%



Hematological Parameters:

Out of 65 patients, 44.6% patients had mild anaemia, 32.3% had moderate anaemia and severe anaemia was noted in 7.6% patients. Anaemia was categorised according to WHO classification. Out of total 65 patients, almost 52% patients had leucocytosis and only 7.6% had leucopenia. Others had normal WBC count. Out of total patients, 69% patients had CRP value positive, 61.5 % patients had LDH positivity, 53.8% had D-dimer values positive and 30% patients had ferritin positivity.

Table 3 : Hematological Paramters;

		Frequency	Percent
Inflammatory markers	CRP	45	69%
	Ferritin	20	30%
	LDH	40	61.5%
	D-Dimer	35	53.8%
Anaemia	Mild	29	44.6%
	Moderate	21	32.3%
	Severe	5	7.6%
	No anaemia	10	15.5%
WBC Count	Leucopenia	5	7.6%
	Normal count	26	40%
	Leucocytosis	34	52.4%

Predictors Of Mortality:

Out of total 65 covid patients, 13 patients had underlying comorbidities , out of which 10(76.9%) had expired and 3 patients survived. Out of 52 patients without any underlying condition, 96.2% patients survived and only 3.8% patients had died. There is a statistical significance between comorbidity and death. Out of total 65 patients, 19(29%) had shown abnormal chest xray findings. Out of this 19, 73.7% had patch present suggestive of pneumonia, 21% had blunting of CP angle suggestive of pleural effusion and 5.3% patients had ARDS picture. 5 (7%) patients had severe anaemia and mortality was found in all patients with severe anaemia ,p value<0.05 which shows statistical significance. Out of 65 patients, 16 patients had required oxygen support on admission . out of which , 69% had experienced mortality and 31% were cured. P value is <0.05. This shows statistical significance between hypoxia on admission and mortality. Talking about the routine immunisation coverage, 59 patients are completely immunised and 9 died out of them which shows 15% mortality. 6 patients are partially immunised out of which 3(50%) patients died.

A study conducted by **Rao et al**[8]. showed that morbidity was more in patients who had hypoxia on admission, abnormal xray finding, need for respiratory support and need for vasoactive support

Table 4: Deaths Vs Comorbidities:(n=65)

	Comorbid	Non comorbid	Total
Cure	3	50	53
Deaths	10(76.9%)	2(3.8%)	12
Total	13	52	65

Table 5: Predictors Of Mortality:(n=65)

No	Parameters	Cure	death	Total	Chi square
1	Hypoxia on admission				
	Yes	5	11	16	<0.05
	No	48	1	49	
2.	Abnormal xray				
	Yes	7	12	19	<0.05
	No	46	0	46	
3	Requiring ventilator support				
	Yes	0	12	12	<0.05
	No	53	0	53	
4	Requiring inotropic support				
	Yes	0	12	12	<0.05
	No	53	0	53	
5	Comorbidity				
	Yes	3	10	13	<0.05
	No	50	2	52	
6	Severe anaemia				
	Yes	0	5	5	<0.05
	No	53	7	60	

CONCLUSION:

Covid positive children with comorbidities have a higher risk of severe disease and associated mortality than the patients having no underlying comorbidity. Otherwise the covid-19 disease in children has milder presentation and good prognosis. Hypoxia on admission, need for inotropic support, need for invasive ventilatory support, abnormal Xray, severe anaemia or having any underlying comorbidity are the predictors of mortality.

All patients had undergone routine immunisation coverage, this could be one of the reason for the covid-19 disease being mild in the pediatric age group due to the cross immunity provided by other vaccines.

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