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Research Article

Comparison of Clinical Features, Lab Parametres and Outcome of Mis-C and Dengue Fever in Children

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Abstract

SARS-CoV-2 is a novel coronavirus which continues to spread and remains a threat to human life across the globe. The paediatric Population infected with the virus are usually asymptomatic or exhibit mild symptoms. MIS-C is a new dangerous childhood disease that occurs 4- 6 weeks after SARS-CoV-2 infection. Worldwide it was first reported in April 2020 in UK. In India 1st reported in KKCTH, Chennai. Most affected children have positive serology for SARS-CoV-2 with a negative PCR showing that MIS-C is related to immune dysregulation occurring after acute infection has passed. Children with MIS-C may manifest some combinations of fever, rash, conjunctivitis, GI symptoms, cardiac dysfunction. This can be related to systemic inflammatory response due to Covid 19, which can have clinical features similar to dengue fever. As dengue is endemic in our region, making diagnosis of MIS-C during dengue season is will be delayed because of sharing of clinical features in severe dengue cases. It can be fatal without early diagnosis and appropriate management in MIS-C.

Keywords: SARS-CoV-2; Covid 19; MIS-C

Objectives

- To identify clinical features and laboratory parameters that differentiate MIS-C cases from dengue fever
- To determine their outcomes.

Materials and Methods

The Study was carried out at NRI General Hospital and Medical College, Guntur. Ethical clearance was given by the Institutional Ethics Committee before starting the study and Informed consent from parents of the children included in the study was taken. The Study Population consisted of PICU admitted patients, in the age group of 1month to 18 years and diagnosed with either MIS-C or dengue. It was a comparative cross-sectional study, carried out from August 2021 to November 2021. The Inclusion criteria was as follow :

- Age group 1month to 18yrs
- WHO MIS-C criteria should be met
- Children with dengue fever admitted in PICU. Confirmed with dengue NS1 antigen positive or dengue IGM ELISA.

Exclusion criteria

Mild dengue, children With dengue with underlying illnesses.

Results and statistical analysis

Data Entry was done using Microsoft excel 2013 and analysis done using SPSS V 16. Qualitative data was expressed in frequencies and percentages and Quantitative data in means and standard deviation. Parametric tests include Unpaired t test for intergroup comparison was used and p value of <0.05 was considered statistically significant. Bar diagrams were used to represent the data. The details of the study participants have been described in table 1 and figure 1.

In the study, myalgias was observed in both but presence of arthralgias favours dengue and hypotension and altered sensorium more common in MIS-C. Ferritin was more elevated in dengue but has no statistical significance. Mean Serum albumin was low in MIS-C. Mean ANC was high in MIS-C. Liver enzymes were deranged in all MIS-C cases. Deranged coagulation was observed in more cases of MIS-C. The results of the study have been discussed in table below.

As dengue is endemic in our region, MIS-C can be confused with severe dengue. Dhooria., *et al*. study showed mean TLC, CRP, IL-6, D-dimer levels were higher in MIS-C than dengue cases. High Ferritin levels, high PCV, leukopenia, severe thrombocytopenia with capillary leak in dengue. Dengue cases were older age group when compared to MIS-C. Echo changes only present in MIS-C. IVIG, steroid, Aspirin given only in MIS-C.

Age distribution	% of Children affected	
	Dengue	MIS-C
1-5yrs	4.50%	53.30%
6-10yrs	42.40%	20.00%
>11yrs	53.00%	26.70%

Table 1: Age distribution of children included in the study.

Age distribution of children: Bar diagram

Sn	Symptoms and Signs	% of children affected	
		Dengue	MIS-C
1	Fever	39.90%	100.00%
2	Erythematous Rash	69.70%	73.30%
3	Cough and Cold	24.20%	73.30%
4	Weakness and Myalgias	97.00%	93.00%
5	Arthralgias	55.00%	0.00%
6	Vomiting	92.40%	80.00%
7	Loose Stools	10.60%	33.30%
8	Abdominal Pain	95.50%	80.00%
9	Altered Sensorium	7.60%	20.00%
10	Petechiae	65.20%	6.70%
11	Conjunctivitis	9.10%	80.00%
12	Edema	19.70%	53.30%
13	Signs of Capillary Leak	65.20%	25.00%
14	Signs of Shock	13.60%	20.00%
15	RD	21.20%	26.70%
16	Hepatomegaly	59.10%	60.00%
17	Ascites	57.60%	26.70%
18	Deranged coagulation	30.00%	54.00%
19	Pleural effusion	45.50%	6.70%

Table 2: Comparison of clinical features.

Figure 1

Comparison of clinical features - Bar Diagram

Figure 2

Age distribution	% of Children affected	
	Dengue	MIS-C
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>11yrs	53.00%	26.70%

Table 1: Age distribution of children included in the study.

Figure 3

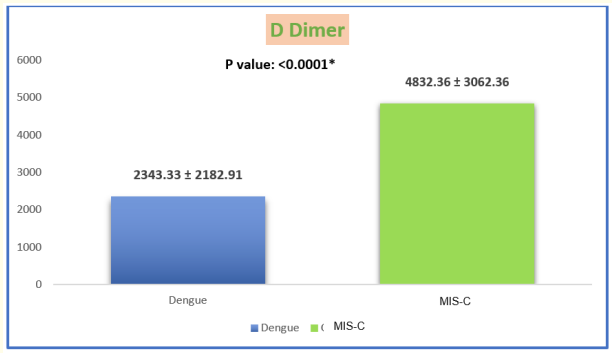


Figure 4

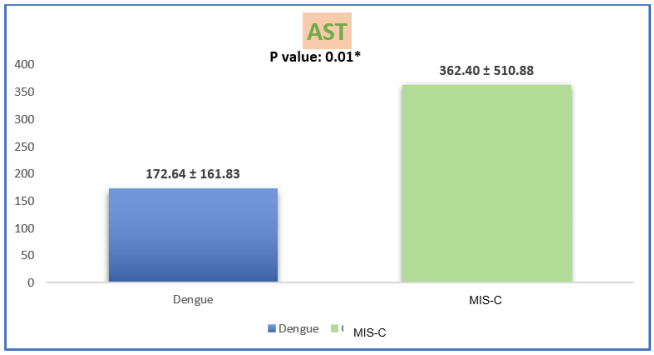
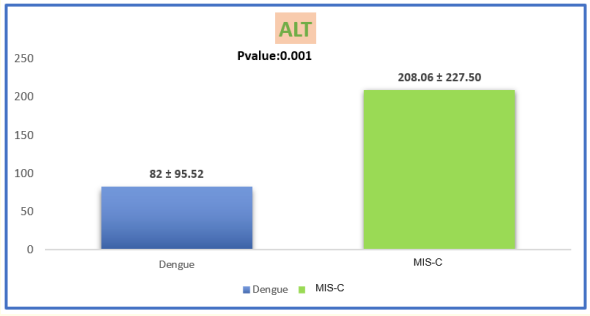


Figure 5



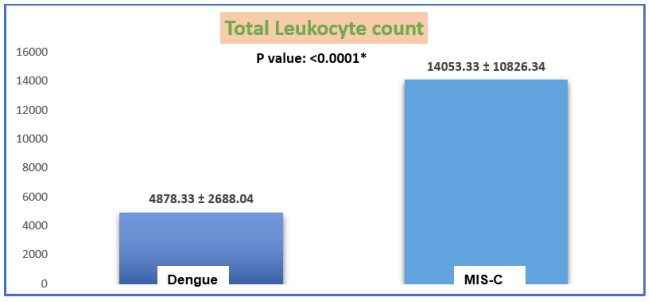
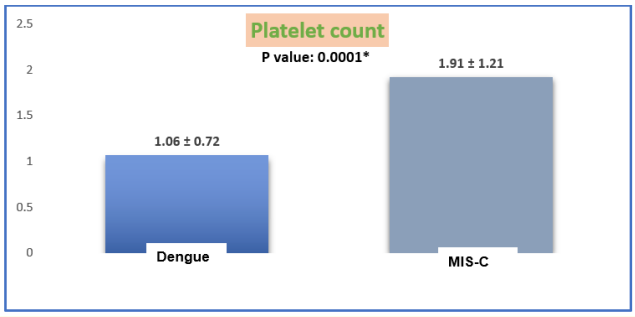
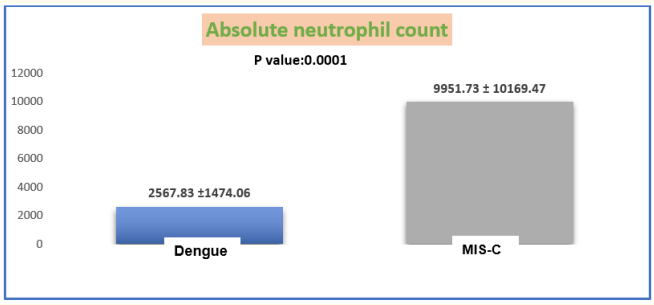


Figure 6





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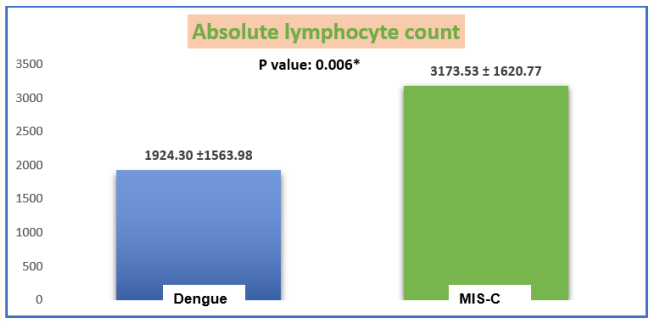

Figure 8

Mean Absolute Lymphocyte count was normal here but we found Lymophopenia in 5 /15 children when age appropriate lymphocyte count cut offs were taken.

Bar diagram of 2d echo

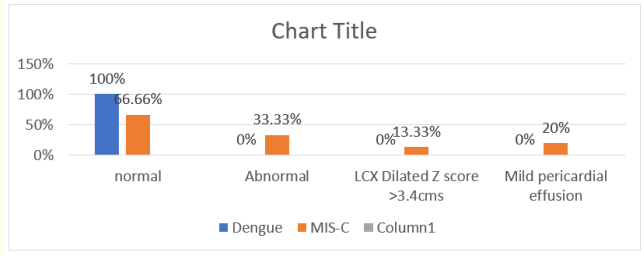

Figure 9

Treatment: Bar diagram

Figure 10

Duration of hospital stay and Outcome: Bar chart

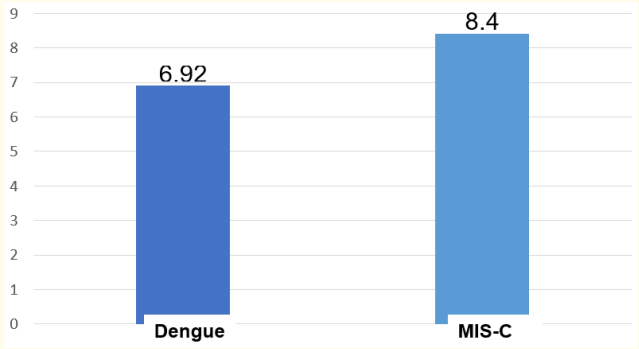

Figure 11

Outcome

- All MIS-C and Dengue cases were discharged with out any mortality.
- We are following MIS-C cases with cardiac involvement.

Discussion

Study by	Mean age (SD)	Sex distribution M, F
Dhooria., *et al.*	7.18 (4.81) years	82%, 18%
Hasan., *et al.*	5.6yrs	71%, 29%
Iveta Racko., *et al.*	8.8yrs	85%, 15%
Fouriki., *et al.*	10.5yrs	83%, 17%
Our's (NRI)	6.66(4.56) yrs	47%, 53%

Table 4: Various studies on MIS-C.

Study Name	Fever	Rash	Conjunctivitis	Weakness	Vomting	Diarrhoea	Abdominalpain	Altered sensorium	Petechiae	Edema	Capillary leak	Shock	RD	Hepatomegaly	Deranged coagulation	2D ECHO changes
Dhooria., *et al.*	100%	26%	21%	18%	50%	12%	35%	24%	-	29%	38%	44%	41%	-	-	21%
Hasan., *et al.*	100%	86%	57%	57%	100%	43%	71%	-	-	-	29%	57%	29%	-	83%	29%
Iveta Racko., *et al.*	100%	77%	85%	46%	69%	46%	85%	23%	15%	69%	61%	38%	46%	46%	-	76%
Fouriki., *et al.*	100%	67%	67%	50%	67%	83%	67%	33%	33%	33%	67%	83%	67%	-	-	50%
Our's (NRI)	100%	73%	80%	93%	80%	33%	80%	20%	7%	53%	25%	20%	27%	60%	54%	33%

Table 5: Various Studies of MIS-C–Symptoms and Signs.

Lab parameters	Dhooria., *et al.*	Hasan., *et al.*	Iveta Racko., *et al.*	Fouriki., *et al.*	Our's (NRI)
CRP(mg/l)	100	182	187	311	98
Ferritin(ng/ml)	2878	415	583	771	770
D-dimer(ng/ml)	1616	4812	5970	-	4832
TLC ($X10^9$/L)	16.6	17.2	-	-	14.1
ANC ($X10^9$/L)	-	12.9	-	17.2	9.8
ALC ($X10^9$/L)	-	1.76	0.55	-	3.2
Platelets (lakh/mm^3)	1.7	2.8	1.12	-	1.9
S. Albumin (g/dl)	3.0	-	2.6	-	2.96
AST (U/L)	524	-	-	-	362
ALT (U/L)	236	-	-	-	208

Table 6: Various Studies of MIS-C–Lab Parameters.

In our study

- Myalgias was observed in both but presence of arthralgias favours dengue
- Hypotension and altered sensorium more common in MIS-C
- Ferritin was more elevated in dengue but has no statistical significance
- Mean Serum albumin was low in MIS-C
- Mean ANC was high in MIS-C
- Liver enzymes were deranged in all MIS-C cases
- Deranged coagulation was observed in more cases of MIS-C.

Conclusion

The presence of fever, rash with conjunctival injection, loose stools and altered sensorium shock requiring inotropic support, a/w high TLC, ANC, mild thrombocytopenia and high CRP,D-dimer with deranged liver enzymes and coagulation profile, lower albumin favours MIS-C. Presence of bleeding manifestations, vomiting, arthralgias along with generalised weakness and myalagias, petechiae with clinical signs of leak along with normal or slightly elevated CRP, leukopenia, moderate to severe thrombocytopenia favours Dengue**.** MIS-C is a hyperinflammatory condition affecting major organs of the body. Early diagnosis can significantly reduce morbidity and mortality. MIS-C can be treated well with IVIG, steroids and aspirin. Delay in diagnosing cardiac complications [coronary artery aneurysms] leads to high mortality. Follow up 2DEHO is important. Dengue will share similar clinical and some lab features of MISC. This study helps us to differentiate MISC from dengue based on certain clinical and lab parameters**.** The relatively small sample size was one of the limitations of the study and more parameters could have been included in the study.

Limitations

- Small sample size
- More of the parameters should be included.

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