MEDICO RESEARCH CHRONICLES
ISSN NO. 2394-3971
DOI No. 10.26838/MEDRECH.2022.9.6.639
Contents available at www.medrech.com

CORRELATION OF SERUM TRANSAMINASES WITH DENGUE SEROLOGY

Dr. Ranjeet S. Patil[1], Dr. D. V. Sumesh Reddy[1], Dr. V. Rasagna[1], Dr. Abhijeet Mulay[2], Dr. S. Varade[3]

1. Postgraduate, department of Medicine, Dr. BVP RMC, Loni
2. Asst. Prof, Department of Medicine, Dr. BVP RMC, Loni
3. Professor, , Department of Medicine, Dr. BVP RMC, Loni

ARTICLE INFO

Article History
Received: September 2022
Accepted: November 2022
Key Words: dengue serology, serum transaminases, Clinical correlation

Corresponding author
Dr. R. S. Patil*

ABSTRACT

Aim: Clinical correlation of dengue serology with serum transaminases
Introduction: Dengue, caused by dengue virus, spread by AEDES genus mosquito, is one of the most significant arthropod borne disease. In severe and less severe forms dengue may affect liver enzymes. The goal of this research was to examine and compare dengue serology with serum transaminases.
Methodology: The study comprised of 109 cases for which informed consent was taken and the patients were monitored throughout their hospital stay. Dengue antibody detection was used to confirm dengue infection and serum transaminases were monitored.
Conclusion: All types of dengue infection frequently result in elevated transaminases values with SGOT rising much more thn SGPT. Patients with NS1 antibody + dengue, have significantly higher serum transaminases levels. Also, high SGOT and SGPT values may be a poor prognostic indication and an early sign of dengue infection.

ORIGINAL RESEARCH ARTICLE

2022, www.medrech.com

INTRODUCTION

The origin of word "dengue" is derived from the Swahili phrase ka-dingapepo which describes the disease is being caused by an evil spirit. The Swahili word 'Dinga' had its origin from Spanish word dengue, meaning fastidious or careful which would describe the gait of a person suffering the bone pain of dengue fever. (1). Dengue virus, a member of the genus Flavivirus of the family Flaviviridae, is an arthropode- borne virus that includes four different serotypes (DENV-1, DENV-2, DENV-3, and DENV-4). With dengue virus (DENV) infection, high level of viremia is associated with involvement of different organs (liver, brain) in the severe form of the disease. The liver is the commonest organ to be involved in dengue. The hepatic manifestations are either a result of direct viral toxicity or dysregulated immunologic injury in response to the virus. The spectrum of involvement includes, asymptomatic elevation of hepatic transaminases to occurrence of severe

manifestation in the form of acute liver failure(ALF). (2)

With this background, the present cross sectional observational study was planned to correlate the serum aminotransferase levels with dengue serology.

AIM AND OBJECTIVE

Aim to correlate the serum aminotransferase levels in patients with dengue infection with dengue serology, presenting to Medicine department of Pravara Rural Hospital, Loni.

MATERIALS AND METHODS

The details of the present study titled "correlation of serum aminotransferase levels with dengue serology." conducted in patients of Dr Vitthalrao Vikhe Patil Pravara Rural Hospital, Loni.

Ethics committee approval.

The study was conducted after the ethics committee approval from the Institutional Ethics Committee of Pravara Institute of Medical Sciences, Loni after submitting the synopsis mentioning the proposed study details and protocols.

Research Design: Descriptive cross sectional.

Sampling Method: Simple random sampling.

STUDY POPULATION:

Patients diagnosed with dengue fever who are in-patients in department of Medicine of Dr Vitthalrao Vikhe Patil Pravara Rural Hospital, Loni.

The patients referred to out-patient department of medicine for dengue fever, and who were later admitted to in-patient were also enrolled in the study.

Source of Data: Detailed history, physical examination, pathological, biochemical investigations, microbiological investigations of the adults diagnosed with dengue fever

INCLUSION CRITERIA:

- Patients positive for Dengue NS1 or Ig M or NS1+IgM or NS1+IgG or IgM+IgG admitted in PRH.
- Age >12 years
- Patients willing to give written informed consent.

EXCLUSION CRITERIA:

- Patients with documented alcoholic liver disease.
- HBsAg positive
- Patients not willing to give written informed consent..

Informed Written Consent: As given in annexures, a well-informed documented consent for will be taken in oral and written in understandable vernacular language; preferably local language. of patient and they were assured confidentiality.

METHOD:

All the selected patients were subjected to detailed history taking, clinical examination, pathological, biochemical and microbiological investigations,.

The following methodology was standardized for the purpose of the study. A structured proforma wasdesigned as attached to Annexure: to collect information and data regarding:

- Name :
- Age:
- Sex :
- Date of Admission :
- IPD No. :
- Address:

General examination

- Pulse :
- BP
- Temperature :

Investigations:

- Haemoglobin:
- Hematocrit:
- TLC:
- Platelet count:
- Dengue serology - NS1 : IgG: IgM:
- Total bilirubin:
- Direct bilirubin:
- SGOT:
- SGPT :
- ALP:
- HBsAg :
- HCV:

DATA COLLECTION:

The data of each patient was collected on a proforma specially designed for this study and which included demographic details of patient, detailed history, chief complaints, vitals, addiction history, blood investigations - haemoglobin , haematocrit, TLC, platelet count, Dengue serology, liver function test consisting of total bilirubin, direct bilirubin, serum aminotransferases, HBsAg and HCV.

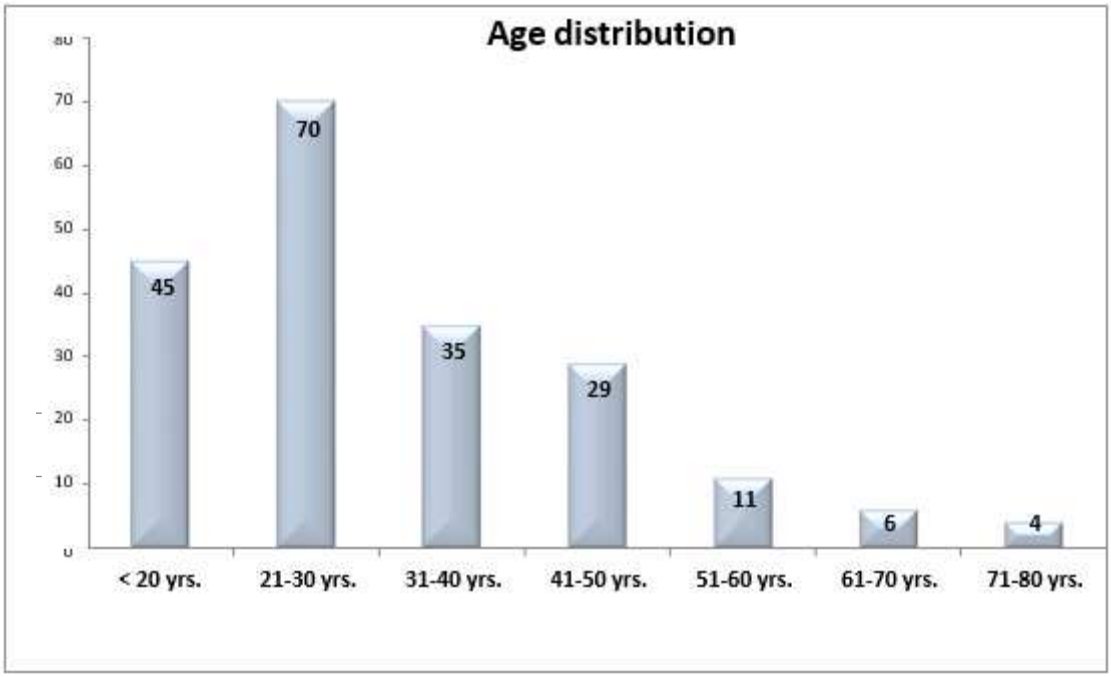
Sample collection:

- For measurement of haemoglobin, haematocrit, total lymphocyte count, platelet count ; a venous blood sample from cubital fossa was collected in purple vacutainer (EDTA). About 5ml of blood was sent to the central laboratory for investigation.
- For detecting Dengue serology, a venepuncture was done from cubital fossa and 5ml of bloodwas sent in red vacutainer.
- For detecting bilirubin, serum aminotransferases, a venepuncture was done from cubital fossaand 5ml of blood was sent in red vacutainer.

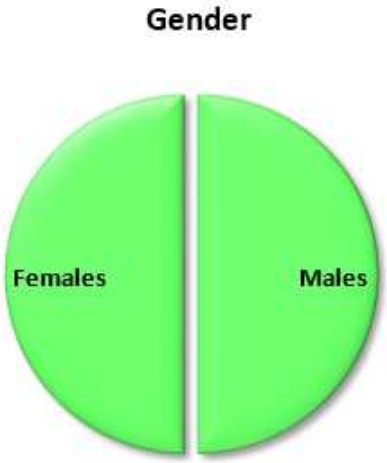
SGOT/AST	15-46U/L Female:14-36U/LMale:17-59U/L
SGPT/ALT	13-69U/L Female:9-52U/LMale:21-72U/L

OBSERVATIONS AND RESULTS

The study was done in department of general medicine, Dr Vitthalrao Vikhe Patil Pravara Rural Hospital. 200 dengue positive patients were included in the study after they had fulfilled the inclusion and exclusion criteria.



Graph no.1: Distribution of cases according to age:



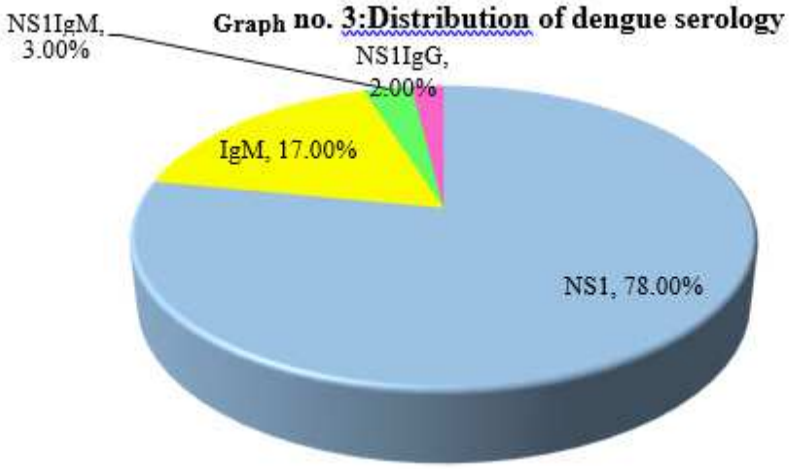
Graph no.2: Distribution of cases according to gender

The study group included 100 males and 100 females, with male to female ratio equal.

Table no.1: Distribution of patients according to dengue serology

Diagnosis	Number of patients	%
NS1	156	78.00%
IgM	34	17.00%

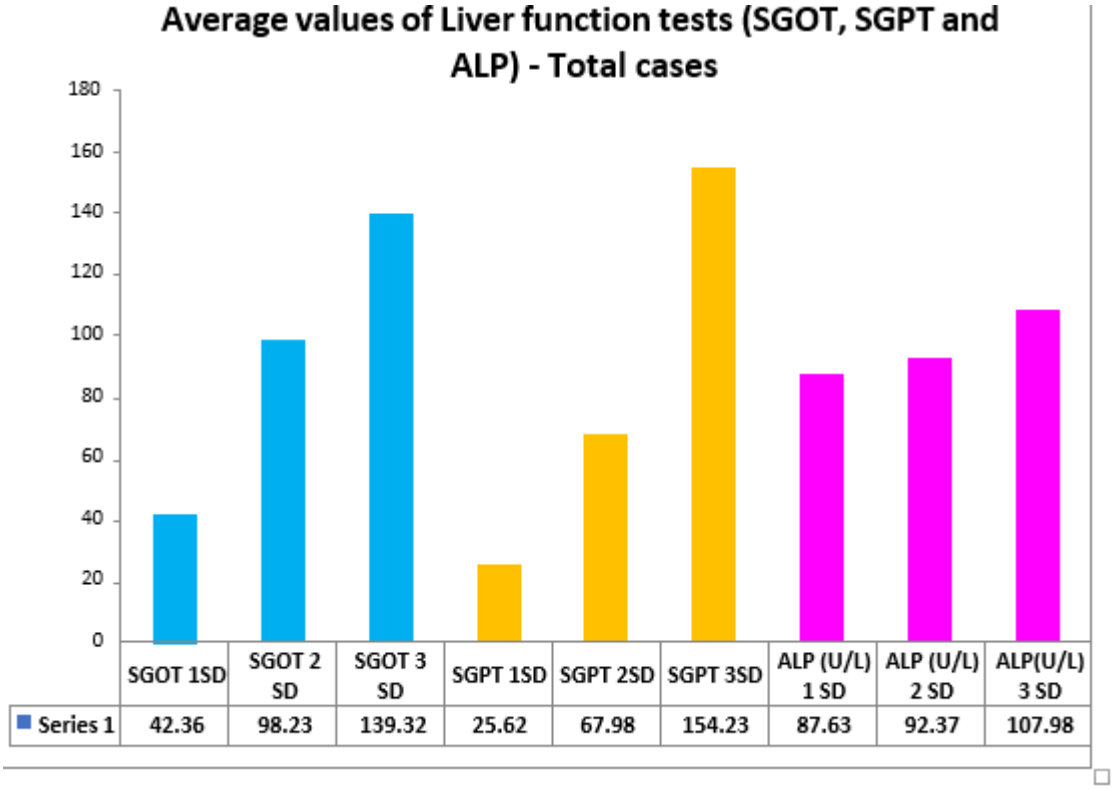
NS1+IgM	6	3.00 %
NS1+IgG	4	2.00 %
Total	**200**	**100.00%**



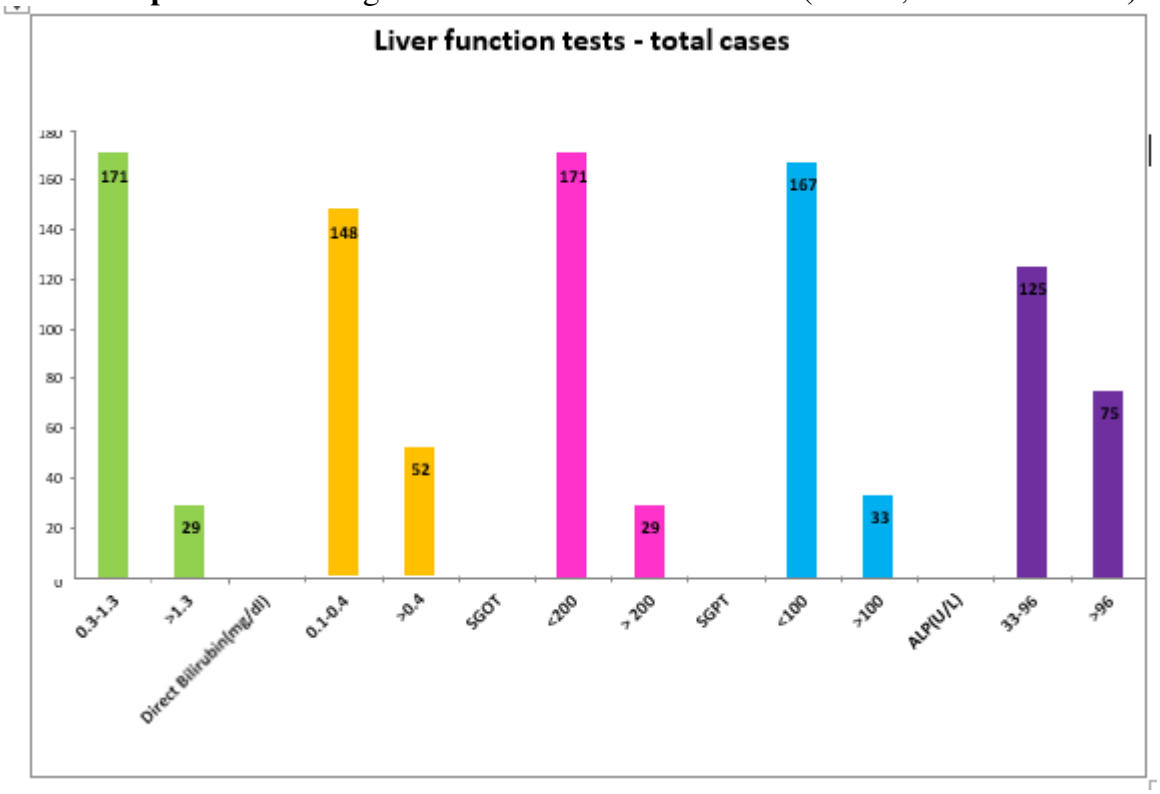
In our study dengue NS1 were 156 patients (78%). IgM were 34 patients(17%), NS1+IgM were 6 patients(3%), NS1+IgG were 4 patients(2%)

Table no. 2: Liver function tests Total cases

Liver function test	**Number of patients (n=200)**	**%**	**Mean ± SD**	'p' value and significance
SGOT (Range 15-46)				p=0.0001, significant
• 1 SD (19-63)	135	67.5	42.36±24.26	
• 2 SD (14-179)	44	22.0	98.23±52.14	
• 3 SD (13-253)	21	10.5	139.32±91.23	
SGPT (Range 13-69)				p=0.0001, significant
• 1 SD (9-39)	118	59.00	25.62±14.87	
• 2 SD (10-124)	56	28.00	67.98±23.68	
• 3 SD (11-207)	26	13.00	154.23±102.33	



Graph no. 4: Average values of Liver function tests (SGOT, SGPT and ALP)

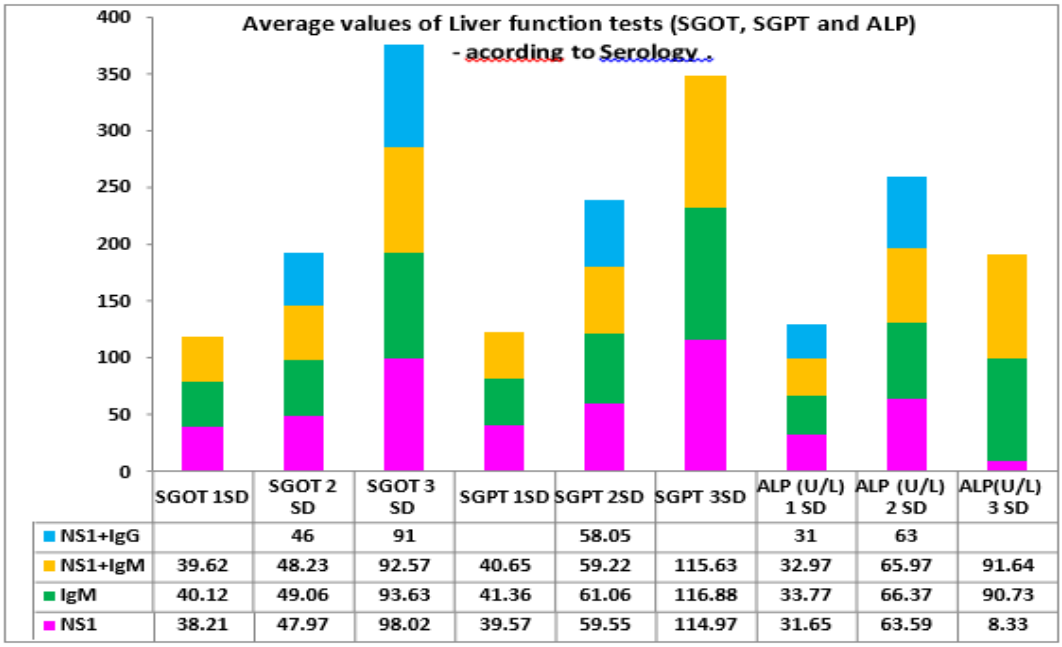


- 135(67.5%) patients had raised SGOT within 1SD ,44(22%) had raised SGOT within 2 SD 21(10.5%) had raised SGOT within 3SD.
- 118 (59%) had raised SGPT within 1SD, 56(28%) had raised SGPT within 2SD,26(13%) had

raisedSGPT within 3SD.

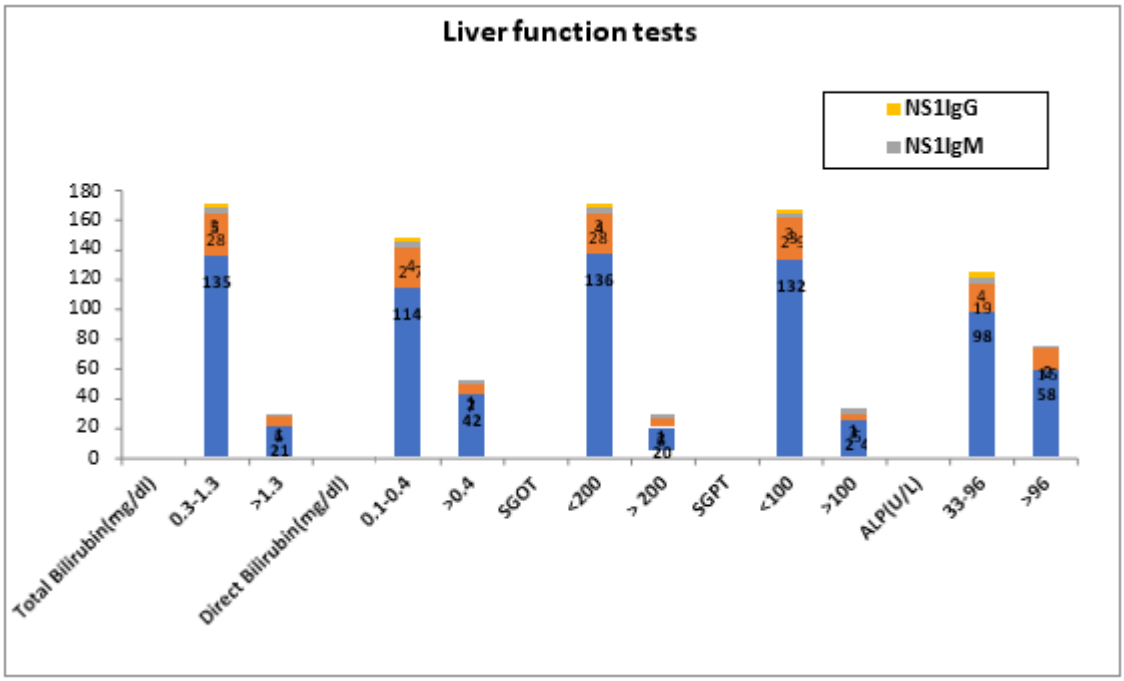
Table no. 3:Liver function tests in dengue according to serology:

Variables	Dengue			
	NS1 (n=156)	IgM (n=34)	NS1+IgM (n=6)	NS1+IgG (n=4)
SGOT (Range 15-46)				
• 1 SD (8-69)	63(40%) 38.21±11.65	15(44%) 40.12±21.49	2(33.3%) 39.62±21.02	0 ---
• 2 SD (7-89)	42(25%) 47.97±28.12	9(26%) 49.06±22.25	2(33.3%) 48.23±18.97	2(50%) 46.00±0.00
• 3 SD (11-186)	29(18%) 98.02±32.03	10(29%) 93.63±21.99	2(33.3%) 92.57±21.00	2(50%) 91.00±0.00
SGPT (Range 13-69)				
• 1 SD (11-68)	59(37%) 39.57±11.44	18(52%) 41.36±9.87	3(50%) 40.65±11.02	0 ----
• 2 SD (12-107)	44(28%) 59.55±9.32	8(23%) 61.06±8.26	2(33.3%) 59.22±12.03	3(75%) 58.05±0.00
• 3 SD (9- 223)	31(19%) 114.97±54.26	8(23%) 116.88±55.97	1(16.6%) 115.63±63.03	1(25%) ---



	SGOT 1SD	SGOT 2 SD	SGOT 3 SD	SGPT 1SD	SGPT 2SD	SGPT 3SD	ALP (U/L) 1 SD	ALP (U/L) 2 SD	ALP(U/L) 3 SD
NS1+IgG		46	91		58.05		31	63	
NS1+IgM	39.62	48.23	92.57	40.65	59.22	115.63	32.97	65.97	91.64
IgM	40.12	49.06	93.63	41.36	61.06	116.88	33.77	66.37	90.73
NS1	38.21	47.97	98.02	39.57	59.55	114.97	31.65	63.59	8.33

Graph no. 6: Average values of Liver function tests (SGOT, SGPT andALP) - acording to Serology Lever Function Test



- In patients with NS1 antigen+ SGOT was within 1SD in 63(40%) patients ,2SD in 42(25%)patients, 3SD in 29(18%) patients.
- In patients with NS1 antigen+ SGPT was within 1SD in 59(37%) patients ,2SD in 44(28%)patients, 3SD in 31(19%) patients.
- In patients with IgM antibody + SGOT was within 1SD in 15(44%)patients ,2SD in 9(26%) patients, 3SD in 10(29%) patients.
- In patients with IgM antibody + SGPT was within 1SD in 18(52%)patients ,2SD in8(23%)patients, 3SD 8(23%) in patients.
- In patients with NS1 antigen + IgM antibody SGOT was within 1SD in 2(33.3%) patients ,2SD in 2(33.3%) patients, 3SD in 2(33.3%) patients.
- In patients with NS1 antigen + IgM antibody SGPT was within 1SD in 3(50%) patients ,2SD in 2(33.3%) patients, 3SD in 1(16.6%) patients.
- In patients with NS1 antigen + IgG antibody SGOT was within,2SD in 2 (50%)patients, 3SDin 2(50%) patients.
- In patients with NS1 antigen + IgG antibody SGPT was within,2SD in 3(75%)patients, 3SDin 1(25)% patients.

STATISTICAL ANALYSIS

Statistical analysis was done by descriptive statistics as mean, SD, percentage etc. The analysis of qualitative variables was done by applying Z test of difference between two sample proportions at 5% (p, 0.05) and 1% (p, 0.01) level of significance.
The analysis of quantitative variables was done by applying Student's Unpaired 't' test at 5% (p, 0.05)and 1% (p, 0.01) level of significance.
The statistical analysis software namely SYSTAT Version 12 (made by Crane's software, Bangalore) was used for analysis of data.

DISCUSSION

Present study conducted in patients of Dr Vitthalrao Vikhe Patil Pravara Rural Hospital, Loni", was carried out after approval from the Institutional Ethics Committee of Pravara Institute of Medical Sciences, Loni, Ahmednagar. A total of 200 patients were included in the study who were having dengue fever. The patients included were ≥ 12years of age. Patients positive for Dengue NS1 or Ig M

or NS1+IgM or NS1+IgG or IgM+ IgG admitted in PRH were included in the study.

A written informed consent was obtained from the participant subjects or his/her legally appropriate relatives. The patients were interviewed for a detailed medical history including the presence of co-morbid conditions and were examined in detail. All the selected patients were subjected to detailed pathological, biochemical and microbiological investigations. Investigations like Hb, haematocrit, TLC, Platelet count, Dengue serology:NS1,IgG,IgM, total bilirubin, SGOT, SGPT, ALP, HBsAg were done.

Distribution of cases according to age:

- Mean age of dengue infection patients was 32.29 years with standard deviation of 17.23 years.
- Maximum number of patients were seen in the age group of 21-30 years i.e. 70 pt (35%) and 45 patients (22.5%) were in age group of <20 years.

Distribution of cases according to gender:

Included 100 males and 100 females, with male to female ratio was equal.

Distribution of patients according to dengue serology:

- NS1 were 156 patients (78%).
- IgM were 34 patients(17%)
- NS1+IgM were 6 patients(3%)
- NS1+IgG were 4 patients(2%)

Similar to our study, conducted by Kumar M et al [3]a total of 756 (77%)cases were detected positive for dengue by NS1 alone, 534 by IgM (18%)and 312(5%) cases were detected by both NS1 and IgM .

Contrary to our study, conducted by Sachin N. Solanke et al [4] 4 showed that out of 48 cases, 20(41.67%) cases were NS1 positive, 10 (20.83%) cases were IgM positive, 02 (4.17%) cases were both NS1 and IgMpositive

Serum aminotransferase in total cases:

- 135(67.5%) patients had raised SGOT within 1SD , 44(22%) had raised SGOT within 2 SD 21(10.5%) had raised SGOT within 3SD.
- 118 (59%) had raised SGPT within 1SD, 56(28%) had raised SGPT within 2SD,26(13%) had raisedSGPT within 3SD.

Similar to our study conducted by Chhina, Rajoo Singh et al [5] Hepatic dysfunction, in the form of AST, ALT, ALP was present in 97.7% (209/214), 93.9% (199/214), 32.6% (47/ 144), patients respectively.

Similar to our study conducted by Chhina, Rajoo Singh et al [5] The mean (±SE) total bilirubin, AST, ALT, ALP, values were 0.93 ± 0.09 mg/dl, 353.7 ± 49.6 U/L, 218.6 ± 27.2 U/L, 135.2 ± 6.5 U/L, respectively.

Similar to our study conducted by Kuo CH et al [6]Abnormal levels of aspartate aminotransferase (AST), alanine aminotransferase (ALT), bilirubin, alkaline phosphatase, and gamma-glutamyl transpeptidase (G-GT) were observed in 93.3%, 82.2%, 7.2%, 16.3% and 83.0% of the patients, respectively. The elevation of transaminases was mild to moderate in most cases, but was 10-fold greater than the normal upper limit for AST and ALT in 11.1% and 7.4% of the patients, respectively.

Similar to our study, conducted by Parkash O et al [7] liver function tests (LFTs) show the median ALT of 88.50 IU/L; IQR 43.25-188 IU/L, median AST of 174 IU/L; IQR 87-371.5 IU/L, median ALK.Phos 80 IU/L;IQR 54-129 IU/L

Similar to our study, conducted by Prasad D et al [8] had elevated liver enzymes. Contrary to our study, conducted by Karoli et al [9] 127 (92%) had elevation of liver enzymes;66 (48%) had raised serum bilirubin.

Serum aminotransferase in dengue according to serology:

- In patients with NS1 antigen+ SGOT was within 1SD in 63(40%) patients ,2SD in 42(25%) patients,3SD in 29(18%) patients
- In patients with NS1 antigen+ SGPT was within 1SD in 59(37%) patients ,2SD in 44(28%) patients,3SD in 31(19%) patients.

- In patients with IgM antibody + SGOT was within 1SD in 15(44%)patients ,2SD in 9(26%) patients, 3SD in 10(29%) patients.
- In patients with IgM antibody + SGPT was within 1SD in 18(52%)patients ,2SD in 8(23%)patients,3SD 8(23%) in patients.
- In patients with NS1 antigen + IgM antibody SGOT was within 1SD in 2(33.3%) patients ,2SD in 2(33.3%) patients, 3SD in 2(33.3%) patients.
- In patients with NS1 antigen + IgM antibody SGPT was within 1SD in 3(50%) patients ,2SD in2(33.3%) patients, 3SD in 1(16.6%) patients.
- In patients with NS1 antigen + IgG antibody SGOT was within,2SD in 2 (50%)patients, 3SD in 2(50%)patients.
- In patients with NS1 antigen + IgG antibody SGPT was within,2SD in 3(75%)patients, 3SD in 1(25)%patients.

SUMMARY

A total of 200 patients were included in the study who were having dengue fever.

The patients included were ≥ 12years of age. Patients positive for Dengue NS1 or Ig M or NS1+IgM or NS1+IgGor IgM+IgG admitted in PRH were included in the study.

- Maximum number of patients were seen in the age group of 21 -30 years i.e. 70 patients (35%) and 45 patients (22.5%) were in age group of <20 years.
- Study included 100 males and 100 females, with male to female ratio was equal.
- In our study dengue NS1 were 156 patients (78%), IgM were 34 patients (17%), NS1+ IgM were 6 patients (3%),NS1+IgG were 4 patients (2%).
- 135(67.5%) patients had raised SGOT within 1SD ,44(22%) had raised SGOT within 2 SD 21(10.5%) had raised SGOT within 3SD.
- 118 (59%) had raised SGPT within 1SD, 56(28%) had raised SGPT within 2SD,26(13%) had raisedSGPT within 3SD.
- In patients with NS1 antigen+ SGOT was within 1SD in 63(40%) patients ,2SD in 42(25%) patients, 3SDin 29(18%) patients.
- In patients with NS1 antigen+ SGPT was within 1SD in 59(37%) patients ,2SD in 44(28%) patients, 3SDin 31(19%) patients.
- In patients with IgM antibody + SGOT was within 1SD in 15(44%)patients ,2SD in 9(26%) patients, 3SDin 10(29%) patients.
- In patients with IgM antibody + SGPT was within 1SD in 18(52%)patients ,2SD in 8(23%)patients, 3SD8(23%) in patients.

CONCLUSION

Maximum number of patients were seen in the age group of 21-30 years i.e. 70 pt (35%) and 45patients (22.5%) were in age group of <20 years. That is the younger population was more effected. Male to female ratio was equal. Maximum number of patients 156 patients (78%) were NS1 antigen positive.

Among total cases 135(67.5%) patients had raised SGOT within 1SD ,44(22%) had raised SGOT within2 SD 21(10.5%) had raised SGOT within 3SD.

Among total cases 118 (59%) had raised SGPT within 1SD, 56(28%) had raised SGPT within 2SD,26(13%) had raised SGPT within 3SD.

In patients with NS1 antigen+ SGOT was within 1SD in 63(40%) patients,2SD in 42(25%) patients,3SD in 29(18%) patients.

In patients with NS1 antigen+ SGPT was within 1SD in 59(37%) patients,2SD in 44(28%) patients,3SD in 31(19%) patients.

From the observations made it was FURTHER concluded that:

- Serum aminotransferases are significantly increased in all types of dengue infection.
- SGOT was raised more than SGPT in dengue infection of all types.
- Raised serum aminotransferases had direct relationship with the severity of the disease.
- Patients who were positive for NS1 antigen had raised serum aminotransferases when

comparedto IgM antibody positive patients.

➢ Therefore:

- Serum SGOT and SGPT levels are indicators for evaluating liver injury in dengue infection and for diagnosis and treatment effect.
- Dengue fever should be considered when liver functions are deranged apart from routine hepatotropic viruses.
- The increase in aminotransferases, mainly SGOT has been associated with disease severity and serves as an early indicator of dengue infection.

REFERENCES

1. Srinivas V, Srinivas VR. Dengue Fever: A Review Article. Journal of Evolution of Medical and Dental Sciences 2015;4(29:5048-5058.
2. Martina BE, Koraka P, Osterhaus AD. Dengue virus pathogenesis: an integrated view. Clin Microbiol Rev 2009; 22: 564-581.
3. Kumar M, Verma RK, Mishra B. Prevalence of Dengue Fever in Western Uttar Pradesh, India: A Gender-Based Study. Int J Appl Basic Med Res. 2020 Jan-Mar;10(1):8-11. doi: 10.4103/ijabmr.IJABMR_337_18. Epub 2020 Jan 3. PMID: 32002378; PMCID: PMC6967337.
4. Sachin N. Solanke , Abhay S. Pohekar*, Jayshree A. Pohekar Clinical and laboratory profile of dengue fever: a retrospective study
5. Chhina, Rajoo Singh, Goyal, Omesh, Chhina, Deepinder Kaur, Goyal, Prerna, Kumar, Raj. et al. (2008).
6. Liver function tests in patients with dengue viral infection.. WHO Regional Office for South-East Asia.. https://apps.who.int/iris/handle/10665/170475
7. Kuo CH, Tai DI, Chang-Chien CS, Lan CK, Chiou SS, Liaw YF. Liver biochemical tests and dengue fever. Am J Trop Med Hyg 1992; 47: 265-270.
8. Parkash O, Almas A, Jafri SM, Hamid S, Akhtar J, Alishah H. Severity of acute hepatitis and its outcome in patients with dengue fever in a tertiary care hospital Karachi, Pakistan (South Asia). BMC Gastroenterol. 2010;10:43.
9. Chen D, Zhang Y, Wu X, et al. A survey of clinical and laboratory characteristics of dengue fever epidemic from 2014 to 2018 in Guangzhou, China. Ann Palliat Med. 2020;9(1):70-81.
10. Karoli R, Fatima J, Siddiqi Z, Kazmi KI, Sultania AR. Clinical profile of dengue infection at a teaching hospital in North India. J Infect Dev Ctries 2012; 6(7):551-54.