

Original Research Article

A study of sterile pyuria in dengue fever

Prashanth V. N., Sneha*

Department of Medicine, Bangalore Medical College and Research Institute, Bangalore, Karnataka, India

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*Correspondence:

Dr. Sneha,

E-mail: biradar.sneha83@gmail.com

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ABSTRACT

Background: Dengue fever is an important tropical disease which is endemic in around 110 countries. It infects 50-100 million people worldwide per year. In India case fatality rate is 1-5% for severe Dengue. Between 2015-2017, 790 deaths have been recorded according to NVBDCP data. Global burden of Dengue has increased at least fourfold over last three decades and now 2.5 billion people at risk of disease. This study aims at determining sterile pyuria as a manifestation in patients presenting with Dengue fever, as patients may present with similar symptoms as that of urinary tract infection, thereby preventing unnecessary use of antibiotics.

Methods: It is a Cross sectional observational study conducted on 100 consecutive patients with serologically proven Dengue fever. Patients satisfying inclusion and exclusion criteria underwent relevant investigations and in patients with urine routine showing pyuria, urine culture and sensitivity was done to rule out urinary tract infection and look for sterile pyuria.

Results: Among 100 patients of dengue studied, age distribution being 18years to 70years, mean age was 33.27 ± 13.2 years of them 78 were male and 22 were female. 41% patients showed pyuria in urine. 25 % patients were culture positive most common being *E. coli* and 16% patients had sterile pyuria.

Conclusions: Sterile pyuria is not a well-recognized entity in Dengue fever and is often missed. This study shows that sterile pyuria is quite common manifestation in dengue fever which resembles urinary tract infection and therefore does not require any empirical antibiotic treatment.

Keywords: Dengue fever, Sensitivity, Sterile pyuria, Urine culture, Urine routine

INTRODUCTION

Dengue fever infects 50-100 million people worldwide per year. In India case fatality rate is 1-5% for severe Dengue.¹ Between 2015-2017, 790 deaths have been recorded according to NVBDCP data.² Global burden of Dengue has increased at least fourfold over last three decades and now 2.5 billion people at risk of disease.³

Dengue fever is caused by Dengue Virus (DENV) which belong to genus Flavivirus of Flaviviridae family. It is caused by one among the 4 subtypes of Dengue virus

(DENV1, DENV2, DENV3, DENV4). Characteristic features are fever, constitutional symptoms and in severe cases, shock and bleeding manifestations (DSS/DHF). An etiological diagnosis can be confirmed by serological testing and virus detection by isolation or molecular technique from the blood during the early febrile phase. Serological testing includes detection of NS1, IgM or IgG using ELISA method.⁴

The disease is considered to be hyperendemic in tropical and sub-tropical regions, most prevalent in Southeast Asia, the Americas, and Western Pacific regions.⁵

A significantly higher seropositivity rate of 58.5% for DENV was found in the urban compared with 41.2% for the rural.⁶

Sterile pyuria is defined as finding of white blood cells in a urinalysis in the absence of infection. It is quite prevalent condition, and population-based studies show that up to 13.9% of women and 2.6% of men are affected by it. Specific populations have a higher risk of this condition; for example, the frequency of detection of sterile pyuria was 23% among In-patients in one study (excluding those with urinary tract infection), and sterile pyuria is more common among women than among men because of pelvic infection.⁷ More than 5-8 white blood cells/high power field is considered to be the cutoff for defining pyuria.⁸

Presently, about 40% of the world’s population is at risk for Dengue and there are 50-100 million cases reported every year. An estimated 500 000 people with severe dengue requires hospitalization each year and about 2.5% of those affected die.⁹

Aims and objectives of this study was to study number of cases with pyuria in Dengue fever, and to estimate sterile pyuria amongst patients with pyuria in Dengue fever.

METHODS

Written informed consent was taken from all the patients and confirmed cases of Dengue fever who were admitted in hospital attached to BMCRI, during August 2018 to March 2019 were included of them 100 cases were selected. Study was approved by the Ethical committee

Inclusion criteria

- Patients willing to give informed consent.
- Age > 18 year
- Patients with dengue fever (NS1 or IgM positive cases)

Exclusion criteria

- Established Type 2 Diabetes Mellitus, HIV positive status, Tuberculosis patients, UTI.
- Patients treated with antibiotics within last one week for any infection.

Statistical analysis

Descriptive statistics was used for analysis. The quantitative variable was expressed as mean and standard deviation. P value <0.05 was considered significant.

RESULTS

Total of 118 patients were recruited for the study. Among them 6 turned out to be newly detected diabetic and 3 patients detected to have HIV and other patients who did

not satisfy inclusion criteria were excluded from the study 100 consecutive patients with dengue positive serology who satisfied inclusion criteria were included and investigations done.

Table 1: Age distribution of patients.

Parameters	Min age	Max age	Mean	Standard deviation
Age	18	70	33.27	13.29

Table 2: Different age groups.

Age	Number
18 to 30 Years	56
31 to 43 Years	25
44 to 57 Years	08
58 to 70 Years	11

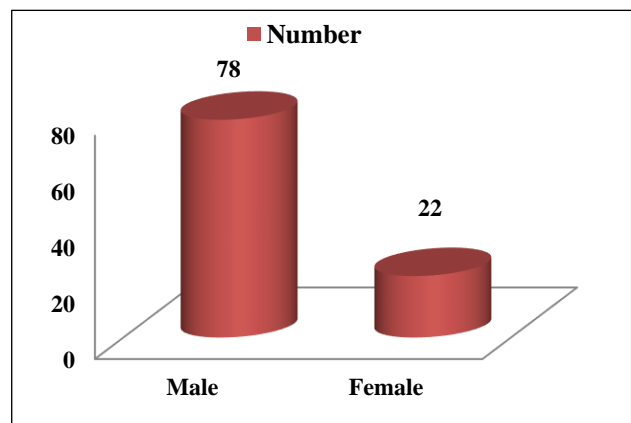


Figure 1: Gender distribution.

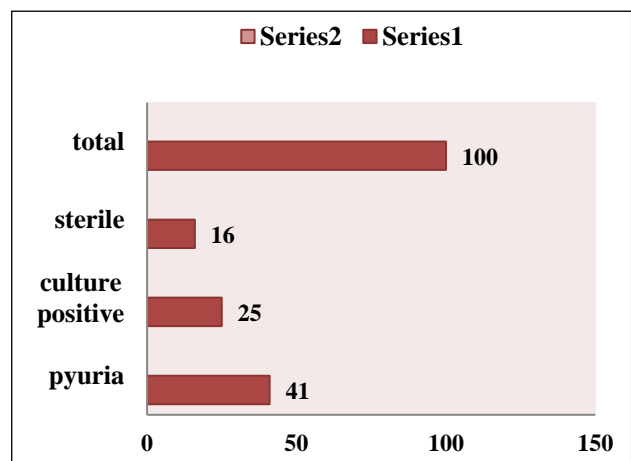


Figure 2: Urine routine analysis result.

Age distribution between 18 to 70 years with mean age being 33.72±13.29 (Table 1) 41% patients had pyuria of which 25% were urine culture positive (Figure 2), most common organism being *E. coli* (Figure 3).

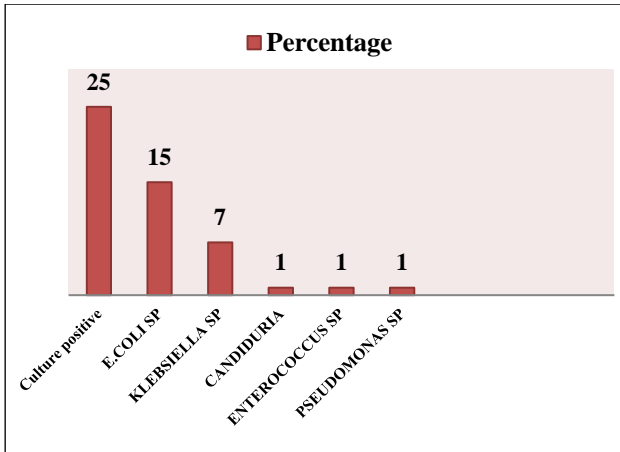


Figure 3: Urine culture and sensitivity results.

And 12% patients were blood culture positive also and 16% patients had sterile pyuria. This study aims at determining almost 16% cases manifested with sterile.

Table 3: Routine investigations.

Parameters	Mean	Standard deviation
HB	13.15	2.03
TLC	6.74	3.26
PLT	58274	42569.4
AST	199.86	239.5
ALT	158.66	193.8

Table 4: Clinical presentation of patients.

Fever	Percentage (100%)
Headache	92%
Generalised myalgia	52%
Pain abdomen	36%
Nausea and vomiting	34%
Loose stools	14%
Burning micturition	18%
Bleeding manifestations	22%
Rashes	15%

Table 5: Laboratory parameters.

Parameters	Percentage
Thrombocytopenia (platelet <50000)	44%
Leucopenia (<4000)	26%
Raised AST/ALT (>45)	52%

DISCUSSION

Of 100 patients included in the study maximum number of patients lie in the age group of 18-30 years (56%) with slightly higher number of males 78% than females (22%) (Figure 1). A study done by Deshwal R et al, had maximum population group between 21-40 years and male patients constituted about 72.2%. Among various manifestations of dengue, Fever was the universal

complaint (100%) which correlated well with our study also.¹⁰ Headache was documented in 92% of patients and rash in only 5%. In a study by Mandal et al, showed headache in 62.16% and rash in 37.84% of cases.¹¹

Most common GI symptoms noted in our study was nausea and vomiting (34%), pain abdomen (36%), anorexia and loose stools (14%). A study by Nimmagadda et al, common GI manifestation were nausea (43.3%), vomiting (40.2%), pain abdomen (41.3%), loose stools (12%) which slightly were more in number.¹²

Among the lab parameters evaluated, thrombocytopenia (<50000) was present in 44% in this study with mean platelet count of 58274. In a study by Daniel R et al, 90% patients had platelet count <100000/cmm and 48% had a count < 50,000.¹³ Leucopenia was seen in 26% of patients in this study. A study done by Deshwal R et al, showed leucopenia (<4000) in 20.19% patients.

Raised liver transaminases was documented in 52% of cases. In a study by Kularatne et al, 88% patients showed elevated ALT and AST, with 122 of them having a two-fold increase which was higher in number compared to our study.¹⁴

Pyuria was seen in 41% of the patients of which 25% were culture positive. Among them E.coli (15%) was the most common organism followed by Klebsiella (7%), Candida (1%), Enterococci (1%) and Pseudomonas (1%). There are no similar studies in this regard however a study done by Ronald A, also showed that E.coli remains the predominant uropathogen (80%) isolated in acute community-acquired uncomplicated infections.¹⁵

This is perhaps a study which is first of its kind as no similar studies have been done so far for comparison. This makes it unique and interesting giving a new opportunity in this regard. Sterile pyuria in dengue fever becomes important because manifestations like high grade fever with chills and rigors, nausea, vomiting, pain abdomen can all resemble UTI. This may be confusing from the clinician’s point of view and may result in unnecessary usage of antibiotics on an empirical basis.

Many of these antibiotics in a viral fever may confound with respect to clinical manifestations like rash or laboratory manifestations like thrombocytopenia. This leads not only to confusion in diagnosis but also leads to antibiotic misuse.

This study was intended to find the percentage of population who have proven dengue fever who can manifest with sterile pyuria. In this study 16% of population had sterile pyuria which is quite significant number. Thereby leading to fresh avenues of research in this regard.

CONCLUSION

Sterile pyuria is a common entity but not well recognised in dengue fever and is often missed by clinicians. It is one of the unique manifestations in dengue which resembles urinary tract infection and does not require any empirical antibiotics and their use should be curtailed.

This is the first clinical study so far with respect to sterile pyuria in dengue fever. Further large scale studies may be required to confirm the same.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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