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Research Article

Concurrent Infection of Typhoid and Dengue: A *Vice-versa* study at Lakhimpur

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ABSTRACT
Dengue and Typhoid are two different diseases represents with fever, is one of the common symptoms. Our study was performed to determine concurrent infection of more than one disease as the diseases having some common symptoms. We have collected the blood samples from the suspected typhoid and dengue patients. The serum were separated from the blood samples and tested for typhoid and dengue by Typhidot, Widal test (tube and slide methods), dengue NS1 ELISA and dengue IgM ELISA. The test results showed that 3.40% numbers of patients were infected by both typhoid and dengue. 5.81 % dengue suspected patients were found negative for dengue but positive for typhoid. Again, 0.18% numbers of typhoid suspected patients found negative for typhoid but positive for dengue. From the test results, we can conclude that similar symptomatic diseases should be confirmed by laboratory tests only. To control the diseases government must take initiative to prevent the routes of the infections.

Keywords: Fever, Typhoid, Dengue, Widal, NS1, IgM, ELISA

INTRODUCTION

Typhoid or enteric fever and dengue both diseases represents fever with some other clinical conditions, though transmission routes both diseases are different. Typhoid or enteric fever transmitted orally through contaminated food and water mainly and dengue fever transmitted by the infective bite of Aedes Aegypti/ albopictus mosquitoes. Typhoid fever or enteric fever is a bacterial disease caused by the gram negative motile bacilli named salmonella species. In India it is mainly caused by salmonella *typhi* and/or salmonella *paratyphi*. The main sign and symptoms of this disease is fever with conditions like abdominal pain, coated tongue, headache, vomiting, malaise, rose spots on the trunk, loss of appetite, toxic look etc[1,2]. Again Dengue is a viral (arbovirus) disease also known as breakbone fever caused by the dengue virus. There are four serotype of this virus called DEN 1, DEN 2, DEN 3 and DEN 4[3]. The sign and symptoms of this disease are high fever, severe frontal headache, pain behind the eyes, loss of appetite, Nausea, vomiting, Muscle pain, joint pains, skin rash etc[2-4]. For the some of the common sign and symptoms of the both diseases it may create diagnostic dilemma for a physician to specify the disease by clinically. Again, due to mimic symptoms it may also be difficult to physician, if there is concurrent infection of both diseases, as both diseases in our study state/district[5,6]. Our study tried to check the concurrent infection of both diseases from the clinical diagnosed patients either as typhoid or as dengue by the physicians. Again, it was also included in our study where the clinical diagnose patients report as negative by laboratory and we tested for other one to check false clinical diagnosis. Some of the study showed the evidence of the co infection of typhoid and dengue where the both disease are prevail[7]. India is a country where every year outbreak of dengue and typhoid are reporting, which indicates that the diseases creates major public health problem in India. Typhoid incidence rate in India is 493.5 cases per 100,000 populations in each year[8]. Again, Dengue is the disease which affects more than 100 countries and its incidence rate is 50-100 million cases each year[9]. We included in our study all the patients reported to the DPHL, Lakhimpur, Assam for typhoid and dengue test as per the advice of the treating physician. The duration of the study was one year from December 2014 to November 2015. We have collected all clinically diagnosed typhoid and dengue serum samples and tested for vice versa. The study area covered the Lakhimpur district of Assam. This is a border district of Assam with Arunachal Pradesh. Total population of this district was 1,040,644 as per 2011 census and this is also one of the common flood affected district of Assam in addition with some other districts[10].

MATERIALS AND METHODS

Blood samples were collected in a plain labeled test tube from the suspected typhoid and dengue patients. The samples were allowed to clot by standing the test tube

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Image 1: Widal test (Tube Methods)

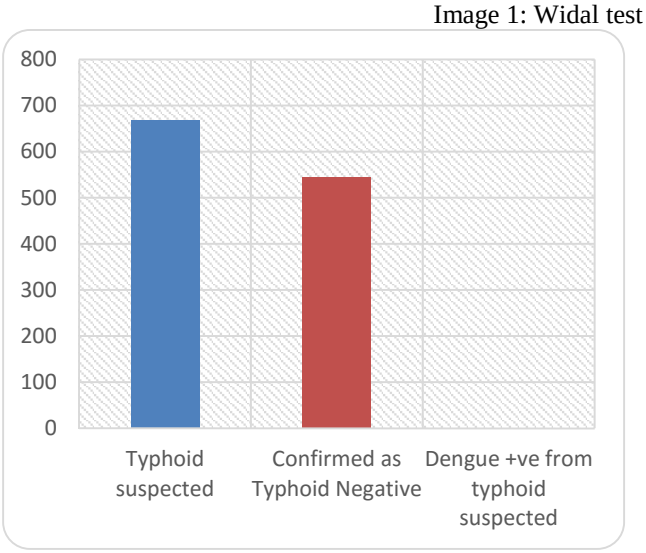

Figure 1: Dengue from Typhoid negative samples

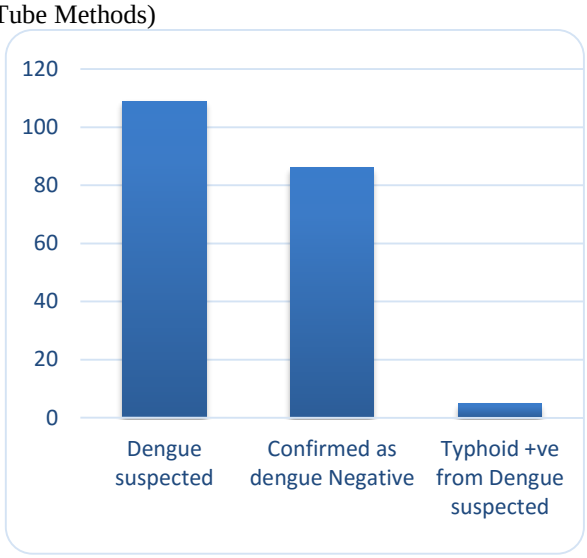

Figure 2: Typhoid from dengue negative samples.

containing the blood samples in a test tube rack for 15-20 minutes. After that test tubes were centrifuged at 3000 rpm for 15 minutes with the help of a centrifuged machine. The centrifuged serum samples were separated from the whole blood samples to other labeled test tube. The samples were tested either for typhoid or dengue as per the clinical diagnosis of the physicians. Further the positive/negative samples were again tested vice versa. To diagnose the both diseases following tests were done. Widal test (tube and slide methods) and typhidot tests were done to diagnose typhoid. For diagnosis of dengue dengue NS1 ELISA and IgM ELISA tests were done.

Widal test

Both tube method and slide methods of widal test were done. For widal tube method, Span diagnostics Ltd.'s kitsand for widal slide method, medsource Ozone biochemicalspvt. Ltd.'s kits were used. The main principle of the test was agglutination against Somatic (O) and Flagellar (H) antigens of Salmonella Species. The titer was done to check quantitative diagnosis.

Typhidot test

Typhidot test was done to check the presence of IgM/IgG antibodies of salmonella typhi and salmonella paratyphi in human serum or plasma. The principle of the test was lateral flow chromatographic immunoassay.

Dengue NS1 ELISA

Dengue NS1 ELISA test was done base on the date of onset of the patients. The samples included where patients onset were less than seven days.

Dengue IgM ELISA

Dengue IgM ELISA test included the patients whose onset was more than seven days. The sensitivity of the kit was 98.53 % and specificity of the kit was 98.84 %.

RESULTS

Total 669 numbers of patients reported to the laboratory for typhoid test and the positivity rate of which was 18.53% (124/669). The all typhoid negative samples were tested for dengue either by NS1 ELISA or by IgM ELISA based on the date of onset of the patients **(Image 1).** One (1) number of sample found dengue positive from the 545 number of typhoid suspected negative samples (Figure 1). 0.18% (01/545) is the positivity rate for the dengue from

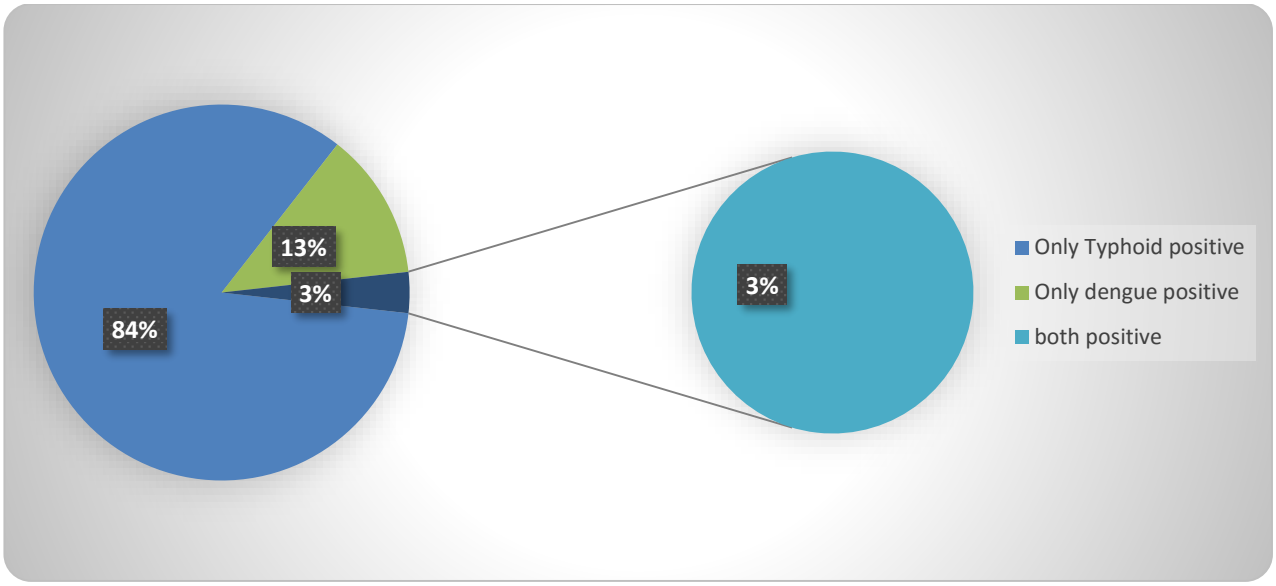

Figure 3: Typhoid, dengue concurrent infection.

typhoid suspected patients. Again, total 109 numbers of the patients were reported to the laboratory for dengue tests and positivity rate of them were 21.10 % (23/109). All the dengue negative 86 numbers samples were tested for typhoid by Typhidot, widal tube methods and widal slide methods. The results showed that 5 (five) numbers of patients were typhoid positive i.e. positivity rate of typhoid from dengue suspected patients are 5.81 % (05/86) **(Figure 2)**. Finally all the typhoid and dengue positive samples were tested for vice versa and found that 5 (five) numbers of patients were having concurrent infection of both dengue and typhoid **(Figure 3)**. The positivity rate was 3.40% (05/147).

DISCUSSION

As per our study it was observed that diseases may change its clinical symptoms as 01 (one) number of typhoid suspected, but confirmed as negative patient showed dengue positive and 5 (Five) numbers of dengue suspected, but confirmed as negative samples showed typhoid positive. The patients were clinically diagnosed by the physician only. Again, 5 (five) numbers of patients were reported concurrent infection of typhoid and dengue.

CONCLUSION

From our study, it is concluded that concurrent infection must be kept in mind by the physician during the treatment of the typhoid/dengue suspected patients, which should be confirmed by laboratory tests only.With time, rapid growth of population leads increasing human waste disposable helps contamination as well as water logging helps mosquito breeding etc which increases the number of diseases. To reduce the disease burden awareness of living behavior is mandatory. This may include sanitation, personal hygiene for typhoid and use of mosquito nets, takes vector control measure and others strategy for prevention of dengue etc. Advertisements in television, radios, drama, road show, cinema, news paper and others social media may also help to public to get awareness to reduce the disease burden.

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