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Microbiology

SEROPREVALENCE OF TORCH INFECTIONS IN A TERTIARY CARE CENTER - CURRENT SITUATION

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ABSTRACT TORCH group of infections (Toxoplasma gondii, Rubella, Cytomegalovirus and the Herpes Simplex Virus) cause diseases in pregnant women and immune-compromised patients where it can lead to poor obstetric outcomes and reproductive failures else may cause life threatening opportunistic infections. There is perceived lacunae in the published literature available for measuring the seroprevalence of these infections in India. A retrospective study was undertaken to determine the seroprevalence of the TORCH infections at a tertiary care centre in northern india. The laboratory data which encompasses the period between Jan 2016 to Oct 2018 involving 1200 patients being treated in various departments of this center was analyzed using ELISA in conjunction with VIDAS and COBAS. The study showed a high seropositivity of the infections caused by the TORCH complex amongst patients despite improved hygiene conditions and health awareness.

KEYWORDS : TORCH Seroprevalence

Introduction

TORCH infection are grouped together because they may result in similar clinical and pathological manifestations and lead to latent infections and recurrence of diseases whenever immunity is lowered. All the infections have their own causative agent and generally they spread through poor hygienic conditions, contaminated blood, water and soil and airborne respiratory droplet (1). Periodic analysis of seroprevalence is necessary for effective monitoring and management in these cases.

Perinatal infections caused by TORCH agents account for 2% to 3% of all congenital anomalies making them some of the most common infections associated with congenital anomalies. Most of the TORCH infections cause low grade or indolent infection in the mother (2). Toxoplasmosis, CMV and HSV infections are also very frequent in immune-compromised patients and require to be diagnosed as such at an early stage. Hence treating physicians are to investigate the patients accordingly to modify their treatment regimens and prophylaxis as required. From the healthcare provider safety perspective, TORCH infections are also a hazard to attending nurses (3).

The diagnosis of these infections depends mainly on serology as these are initially asymptomatic or causes minor illness in healthy individuals and are difficult to diagnose clinically. The detection of the IgM and IgG antibodies against TORCH is currently the best approach for the identification of these infections, where IgM seropositivity will indicate recent infection and IgG seropositivity will indicate infections occurring in past. There is a not much current data regarding seroprevalence of TORCH infections in occurring in a tertiary care center which hosts a number of transplant recipients. This study encompassed detection of the seroprevalence of TORCH infections, by detection of the IgM and IgG antibodies among these subset of patients.

Materials and Methods

At the laboratory of a tertiary care hospital, over a two year and ten month period, subsets of 1200 sera samples collected from patients for the detection of the IgM and IgG for TORCH and were analyzed by commercially available ELISA kits in conjunction with VIDAS and COBAS. The study population included kindney and bone marrow transplant recipients, new borns and pregnant women who were in the first trimester of their pregnancy.

The sera were assayed according to the manufacturer's instructions and the results were calculated on the basis of the cut off Activity Index (AI). Results are presented as positive or negative for the antibody, indicating the presence or absence of IgG and IgM antibodies. For VIDAS / COBAS platform, Toxoplasma IgG and IgM tests, positive results were defined as value greater than 8 international units (IU)/ml, equivocal results range from 4 to 8 IU/ml and negative results are defined as values less than 4 IU/ml respectively (4). For Rubella IgG and IgM tests, positive results were defined as value greater than 15 international units (IU)/ml, equivocal results range from 10 to 15 IU/ml and negative results are defined as values less than 10 IU/ml respectively according to manufacturer's instructions. For HSV Type I and II we used the cut off value as per the manufacturer's instructions, values greater than 1.2 times the cut off value was taken as positive, values between 1.0 and 1.2 times the cut off value were regarded indeterminate and values less than 1.0 times the cut off value were taken as negative. No antibody titration was done for anti-toxoplasma antibody.

Results

Results obtained are presented in Table 1. All the tests have been evaluated against the reference range in the reports of the laboratory.

Among all cases, 2 (0.39%) samples were found to be seropositive for Toxoplasma IgM, CMV IgM antibodies were found in 20 (1.94%) samples, HSV1 IgM antibodies were found in 14 (3.29%) samples, HSV2 IgM antibodies were found in 9 (2.12%) samples, Rubella IgM antibodies were detected in 12 (2.39%) samples, indicating recent exposure to infecting agent. The levels of IgG antibodies were considerably higher indicating past infection 81 (15.76%) samples were found to be seropositive for Toxoplasma IgG, CMV IgG antibodies were found in 904 (87.5%) samples, HSV1 IgG antibodies were found in 110 (29.18%) samples, HSV2 IgG antibodies were found in 58 (15.76%) samples, Rubella IgG antibodies were detected in 357 (76.44%) samples.

Discussion

Immune-compromised patients and pregnant women are the two major risk groups affected by the TORCH group of infections. Post-transplant infections are likely to follow a predictable pattern with regard to timing after transplant. The early infections (within the first month) are more likely to be due to nosocomially acquired pathogens. TORCH infection are likely to manifest in between 1 to 6 month period (5). In pregnant women incidence of preterm deliveries, and congenital malformation has been reported to be more in patients with Toxoplasma positive titers, while the incidence of spontaneous abortion are seen more in close association in patients with Rubella, CMV, and HSV-positive titers (3). Sero-epidemiological studies have shown that a high percentage of women in the childbearing ages in India, are susceptible to Rubella infection(6). The seroprevalence of the TORCH microorganisms varies greatly in different populations. A comparison of seroprevalence in different studies is given in the Table 1. In our study IgM seropositivity was considerably lower for all infections of the TORCH group than other studies compared in table 1, This could arise because of the differences in the studied populations. Immune compromised patients, which comprised sizable numbers in our study, tend to have lower antibody response to infectious agents compared to healthy individuals. IgG response to CMV although considerably higher than the study done by Lavan singh etal (7), but is on the lines of similar to study done by Turbadkar et.al (8). HSV IgM levels although lower than than the study done by Lavan singh etal (7)

and Sen etal (9), but is similar to study done by Turbadkar et.al (8). The study by Turbadkar et.al have shown positivity for Rubella IgG 61.3%, while we had highest positivity for IgG (76.44%).

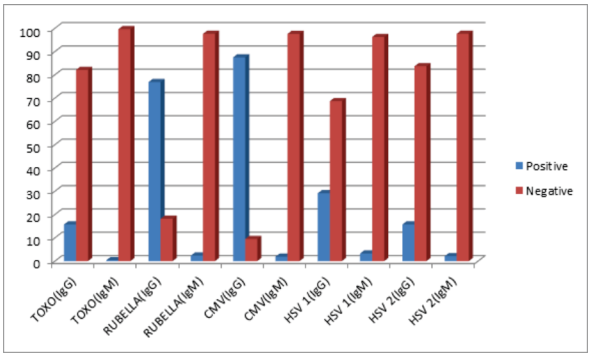
Immune compromised patients are always at risk of developing illness due to infection with opportunistic microorganisms such as CMV and HSV and often have recurrent attacks of illness and complications. It is important to distinguish CMV infection from CMV disease in considering treatment options. CMV infection is defined as evidence of CMV replication with or without presence of symptoms, and CMV disease requires both evidence of infection as well as presence of symptoms, including viral fever or malaise, leukopenia, decreased platelets or signs of tissue invasion (e.g., hepatitis, pneumonitis, retinitis or gastrointestinal disease). CMV infection may occur as reactivation of latent recipient infection, primary infection or reinfection. Donor- derived infections are the most common. CMV disease is a risk factor for biopsy proven acute rejection and overall recipient mortality (5)

Routine prophylaxis with co-trimoxazole is provided under the National AIDS Control Programme (10). Cotrimoxazole Preventive Therapy (CPT) is effective against several organisms, including Toxoplasma. Recent evidence has shown that CPT helps prevent morbidity and mortality in adults with both early and advanced HIV disease, however its usefulness in transplant recipients needs to be ascertained. In our study, IgM seroprevalence indicating current or recent infection was in the range between 0.39 to 3.29%. Although lower than rest of the studies, it indicates that there exist a risk of acquiring one of these TORCH group of infections at any time and thus needs to be monitored. In our study we found higher positivity for Rubella IgG (76.44%) as compared to other study groups. Herpes Simplex having a sexual mode of transmission, in a high risk groups, is amenable to secondary prevention. With a seroprevalence for HSV1 IgM and IgG being 3.29% and 29.17% and HSV2 IgM and IgG being 2.12% and 15.76% respectively, it is indicative of the scope for interventions (11). Prevalence of CMV IgG antibodies is found to be 87.5% which is on higher side of rest of studies. We have brought the data collected at our center, however more studies are required to understand the phenomena observed in this study.

Table 1 – Comparison of seroprevalence of Antibodies against TORCH Infections

	Sample Size	Toxoplasma		Rubella		CMV		HSV	
		IgM	IgG	IgM	IgG	IgM	IgG	IgM	IgG
Present Study	514(Toxo) 502(Rub) 1033(CMV) 426(HSV)	0.39%	15.76%	2.39%	76.44%	1.94%	87.5%	3.29% (HSV1) 2.12% (HSV2)	29.17% (HSV1) 15.76% (HSV2)
Lavan Singh etal(7)	162	18.25%	09.73%	08.02%	38.88%	29.01%	22.22%	07.40%	10.49%
Sen et al(9)	380(Toxo) 414(Rub) 374(CMV) 450(HSV)	19.4 %	-	30.4%	-	34.7 %	-	33.5%	-
Turbadkar etal (7)	380	10.5%	42.10%	26.8%	61.3%	08.4%	91.05%	03.6%	33.58%
Rathore etal (9)	200	-	-	-	-	-	-	-	07.5%
Kaur etal (10)	120	11.6%	-	08.3 %	-	20.8%	-	-	70%

Fig 1 – Seroprevalence of Antibodies



CONCLUSION:

TORCH infections are very important group of infection in day today clinical practice. Some of them are preventable and some are curable to some extent. These carry different socioeconomic effects on two different patient's population. We studied and analyzed the current situation in our patients which comprised of variety of conditions they have been referred to this tertiary center. Our study revealed wide and highly variable seroprevalence when compared with other studies. There has been significant number of cases who have acquired recent infection (IgM positivity) and thus emphasized the need of very close monitoring. A large number of patients were found to be having no serpositivity for any of the infection. Positivity for Rubella IgG, at the level of 76.44%, gives a different message. Since large part of our data also comprised of male patients where immunization is not administered, this indicated natural infection to be playing its role and many a times these infections go undetected because of low level of clinical suspicion. An increased level of immunization coverage for Rubella will result in increased seroprevalence and consequently lowered morbidity in the long term. There is thus, a need to develop public health policies to prevent TORCH infections among vulnerable groups especially for immunization programs targeting immune suppressed individuals.

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