Original Research Article

Seroprevalence of cytomegalovirus infection in tertiary care hospital

Sunitha B[1], Vamsi Krishna Gottipati[2*]

[1]Assistant Professor, Department of Microbiology, NRI Institute of Medical Sciences, Sangivalasa, Visakhapatnam, India
[2]Consultant General Surgeon, Gottipati Hospitals, Addanki, Prakasam(Dt), Andhra Pradesh, India

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Abstract

Background: Cytomegalovirus otherwise called as Herpes 5 is the member of Herpesviridae family. This possesses an important public health problem as it may cause serious morbidity and mortality in congenital infected newborns and immune-compromised patients more notably in transplant recipients and HIV infected persons. The emergence of AIDS in India has necessitated the establishment of reliable test for diagnosis of CMV infection as the damaged immune system permits CMV which can occur during pregnancy following primary or recurrent infection in mother can result in IUGR and fetal abnormalities.**Aim:** To study the seroprevalence of CMV infection in tertiary care hospital.**Material and methods**A total of 122 samples were included in the study which contain both serum and CSF samples. 98 serum samples from pediatric patients and antenatal women suspected of CMV infection were collected.24 CSF samples were collected from patients with suspected neurological CMV infection. Samples were tested for IgM CMV antibodies by ELISA.**Results:**Out of 98 serum samples, 16 (16.3%) were positive for IgM CMV antibodies which includes 12 positives from pediatric patients and 4 positives from antenatal women. Out of 24 CSF samples, 4(16.6%) were positive.**Conclusion:** In the present study, the number of seropositive was more in pediatric age groups, followed by adults. In few cases, neurological involvement was seen by Cytomegalovirus infection. This study shows that screening for CMV in antenatal women and pediatric age group will help the prevention and prompt treatment instituted immediately.

Key Words: Seroprevalence, Cytomegalovirus, IgM.

Introduction

Human cytomegalovirus (CMV) also called human herpes virus 5 is the largest virus in Herpesviridae family. In 1956, Margaret G. Smith recovered the virus from sub maxillary gland tissue of a dead infant. Sero prevalence of Cytomegalovirus (CMV) among ado- lescents ranges from 47% to 89%. [1-8] Studies indicate that CMV may be transmitted by saliva, urine, blood, cervical secretions, and semen. [4-8] The prevalence of CMV is high in both developed and developing countries and is an important public health problem. [9-10]

Cytomegalovirus is an extremely common infection causes an array of clinical syndromes such as congenital and perinatal infections, CMV mononucleosis in adults and severe infection in immunocompromised and transplant recipients.

Following primary infection, cytomegalovirus establishes a lifelong latent infection that periodically reactivates. Primary infection, reactivation and reinfection during pregnancy can all lead to in utero transmission to the developing fetus associated with intrauterine death or congenital fetal abnormalities and intrauterine growth retardation along with developmental delays, blindness and deafness as a sequel after the birth. [11] The clinical consequences are worse when infection takes place before 20 weeks. [12]

**Correspondence*
Dr. Vamsi Krishna Gottipati
Consultant General Surgeon, Gottipati Hospitals, Addanki, Prakasam(Dt), Andhra Pradesh, India
E-mail:vamsikris1266@gmail.com

Congenital CMV infections are a major cause of permanent hearing loss, chorioretinitis, and neurological impairment and it causes serious morbidity and mortality in immunocompromised patients, most notably transplant recipients and HIV infected persons and poses an important public health problem. The availability of diagnostic assays for the early identification of reactivated CMV replication has considerably improved the clinical management of these patients thus reducing the risk of CMV disease and allowing presumptive treatment as an alternative to universal prophylaxis

The magnitude of this problem in India has not been adequately investigated and it still is a major health problem warranting strong preventive measures.

Material and methods

The study was carried out in ICMR virology laboratory in King George Hospital, Visakhapatnam. A total of 122 samples (both blood and CSF) from clinically suspected CMV infection were included in the study. Blood samples received were centrifuged at 3000 rpm for 5 minutes & serum was separated. Serum & CSF samples were stored at -20℃. All the samples were tested for IgM antibody by EUROIMMUN ELISA kit and results were interpreted according to the kit lit.

100 µl of positive control, negative control and patient serum each were added into the respective microtitre wellsPipetted 100 µl of enzyme conjugate into each well,Added 100 µl of chromogen substrate into each well, Pipetted 100 µl of stop solution each well.

Reading

- Photometric measurement of the color intensity should made at a wavelength of 450nm and a reference wavelength between 620 nm and 650 nm within 30 minutes of adding stop solution

- EUROMMUIN recommends:
- Ratio <0.8: Negative
- Ratio >0.8: Borderline
- Ratio>1.1: Positive

Results

Out of 98 serum samples, 16 (16.3%) were positive for IgM CMV antibodies which includes 12 positives from pediatric patients and 4 positives from antenatal women. Out of 24 CSF samples, 4(16.6%) were positive.

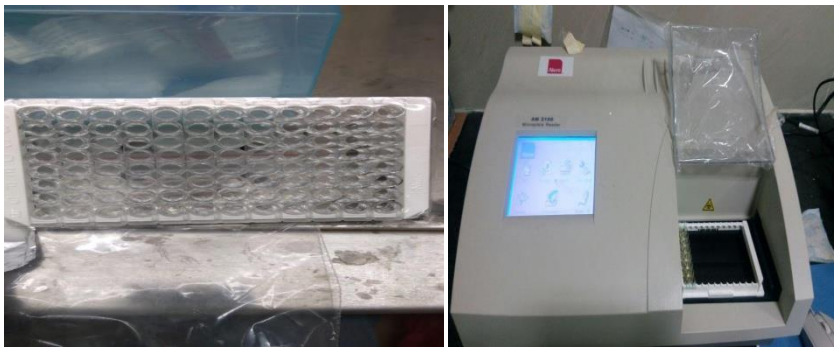

Fig 1: Microtiter plate

Table 1:Distribution of sample

Department	Sample	Total no. of samples received
Pediatric	Blood	42
OBG	Blood	56
Neurology	CSF	24

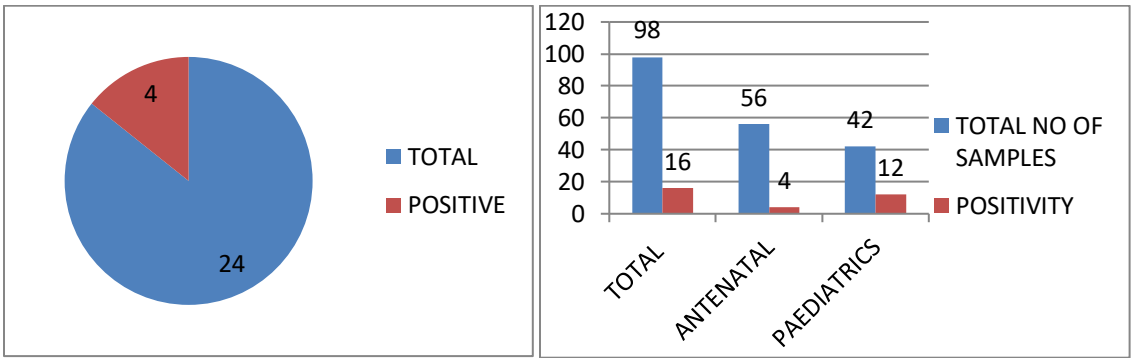

Fig 2: Percentage of positivity in serum sample

Discussion

Human cytomegalovirus (CMV) poses an important public health problem as it may cause serious morbidity and mortality in congenitally infected newborns and immunocompromised patients, most notably transplant recipients and HIV-infected persons. It is probably one of the most common infections known to humans and is characterized by a self-limiting infection in healthy individuals. CMV infection is the single most frequent cause of infectious complications in the early period following kidney transplantation

By far, the major role in transmitting CMV to the fetus is played by primary infection of the mother during pregnancy and hence in this respect, diagnosis of primary infection during pregnancy is a major task of the diagnostic virology laboratory.

IgM detection in a pregnant woman is likely to be a reliable marker of primary infection; as it can reveal various clinical situations as related with acute phase of primary infection, convalescent phase of primary infection or persistence of IgM antibody. In pregnant women, detection of IgM antibody may be related to a primary infection occurring during pregnancy when the IgM titer falls sharply in sequential blood samples. Presence of low, slowly decreasing levels of IgM may indicate a primary infection initiated some months earlier and possibly before pregnancy. More recently, enzyme-linked immunosorbent assays (ELISAs) have been more widely used in both the indirect and the capture ELISA format, with either labelled antigen or antibody.CMV is the most common congenital infection worldwide with estimated incidence of 0.2%-2.2%, and seroprevalence ranging between 45%-100% and the seroprevalence in India is 80%-90%. [13]A recent study reported 18.75% of babies with congenital anomalies to be positive for CMV IgM antibodies using m-capture ELISA, none of the mothers of whom were positive for IgM antibodies although all were positive for IgG antibodies, indicating primary infection in the past or reactivation/reinfection with a different strain of CMV in early pregnancy. In the present study prevalence of CMV infection in antenatal mothers is 7.14% correlated with Mini P.Singh,et al [14],who reported seroprevalence of 7.8%;Mahadevan Kumar et al [13] who reported 9.46%; Kapil A, et al[15],who reported 12.9%; Lone R,et al [16],reported seroprevalance of 15.98%; A higher prevalance of 22.03% is reported by Berry V, et al. [17]

In the present study prevalence of CMV infection in paediatric age

group is 28.5 correlated with Broor S, et al [18], who reported 20%; Ganghoke, et al. [19], reported IgM positivity of 18.75% with congenital infection and Mini p singh, et al. [14],reported positivity of 12.5%.The prevention of transmission of CMV infection encompasses the following: preventing congenital CMV infection during antenatal period, preventing ingestion of infected maternal genital secretion during delivery, avoiding breastfeed, preventing contact with saliva, and other body fluid containing CMV. Routine hygiene precautions are essential, especially in pregnant females, since it causes irreversible damage to the fetus.Significant association of the various epidemiological factors (age, socioeconomic status and parity) with CMV suggests also revealed that women of child bearing age are more exposed to this infection. As no effective treatment and vaccine against the CMV is available, more emphasis should be laid upon educating women (to maintain good hygiene, limited contact with infected children and responsible sexual practices) and their prospective screening to reduce the foeto maternal transmission. Screening of antenatal women for CMV IgM antibodies is necessary so that the gynecologist or pediatrician can be alerted about the risk of infection to the newborn. Newborns in such cases can be tested for CMV IgM antibodies which will help in timely therapy of the infected neonate and will also prevent the spread of infection to other children. [13]The magnitude of this problem in India and the various diagnostic modalities used have not been adequately investigated and, hence, CMV infection is still a major health problem warranting strong preventive measures. The ultimate goal of the prevention program is to develop a vaccine that can be administered to seronegative women of childbearing age to prevent primary infection during pregnancy.

Conclusion

Worldwide, there are not many guidelines recommending routine screening for CMV**.** CMV is an important infection affected in antenatal mothers, children, immuno-compromised patients, transplant recipients, etc causing morbidity & mortality. This study implicates that screening for CMV in antenatal women and paediatric age group helps in guiding the prevention and prompt treatment instituted immediately.

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