INTRODUCTION

Like other members of the Herpesviridae family, Human Cytomegalovirus (HCMV) can remain latent in some blood cells (B and T lymphocytes, polymorphonuclear leucocytes). CMV infection is endemic and ubiquitous, affecting 40-80% of the population in industrialized countries and almost all the population in developing countries. In some categories of patients (immunocompromized patients, organ and bone marrow recipients, cancer (oncologic) patients, patients with AIDS) CMV acts as an opportunistic pathogen, causing multi-organ involvement (lungs, liver, intestine, central nervous system, etc.) with high mortality rates (up to 60-80% without antiviral treatment). Serologically negative organ recipients can contract the infection from an organ from a seropositive donor. As regards blood transfusions, theoretically blood from any seropositive donor can transmit the infection, as it contains cells carrying the latent infection; the risk of infection is estimated to be 3-5% (1.5-40% with antiviral treatment).

The use of seronegative blood for transfusions to seronegative patients is used as a means of prevention; however, the limited availability of blood from seronegative donors, for use with high-risk patients has led to an increasing interest in the development of methods to eliminate the infectivity of blood from seropositive donors.

The effectiveness of leucodepletion (bedside, laboratory and pre-storage filtration) is now widely documented, and reduces the number of white blood cells present in the blood components from 3 to 5 log10 (99.9%). In clinical terms, leucodepletion not only prevents and reduces the risk of viral reactivation/transmission in the recipient but is also effective in preventing febrile non-Hodgkin lymphocytosis (FNH), platelet refractoriness and acute graft-versus-host reaction (GvHD), above all in immunosuppressed patients.

Since 1996 at the Central Regional Virology Laboratory and Molecular Biology of Ancona Hospital (Regional Department of Transfusion Medicine), serological screening has been in place to research specific anti-CMV IgM and IgG antibodies in the donated blood units. The serological screening protocol includes:

- screening for anti-CMV IgM and IgG in candidate donors attending one of our donor centers for the first time, for serological screening for the virus
- screening for anti-CMV IgM and IgG in periodic CMV-negative donors, on each donation, to highlight any seroconversion, leading to the elimination of the blood unit and the temporary suspension of the donor
- screening only for anti-CMV IgM in periodic donors already testing positive for IgG on each donation, to highlight any recurrent or reactivated infection.

In the period of study from 1st January 2013 to 30th April 2014 we analyzed:

- 36,963 donations of blood and blood components and annual controls of periodic donors and 10,606 controls of willing donors to screen for specific class anti-CMV IgM antibodies using CMIA and ECLIA immunometric assay methods.
- A total of 53,807 samples of donations of blood and blood components and annual controls of seronegative donors to screen for specific class anti-CMV IgG antibodies using the CIAA immunometric assay method.
- Doubt or positive samples were re-tested with the LIAISON® XL system (DiaSorin Saluggia Italy): 6% of the samples were tested, in the LIAISON® XL CMV II test and 10% of the samples with LIAISON® XL CMV II IgG (DiaSorin Italy).

RESULTS

None of the acceptance and donation consent forms (required under Ministerial Decree - D.M. of 3rd March 2005) completed by the periodic donors who were CMV-IgM positive reported any symptoms.

The 134 confirmed CMV/IGM positive blood and blood component donation corresponded to:

- 118 units of blood from seronegative periodic donors (with previous IgG-CMV control negative) and therefore with a primary infection in progress (Tab 1):
  - 47 units of blood from periodic donors with previous IgM-CMV control positive and therefore with viral reactivation or reinfection (Tab 2).

The percentage of IgM positives out the total was low (0.12%), but this in any case makes the donors asymptomatic.

CONCLUSIONS

Two approaches have been found to be particularly effective in preventing the transmission of the CMV infection through transfusion: the first is based on the administration of units of leukocyte-depleted blood and blood components using leucodepletion filters, which are of proven efficacy but rather costly. The approach we chose involves the selection of donors by serological screening to test for anti-CMV antibodies, in order to

- the identification of blood units with a high risk of transmitting the infection;
- the use of seronegative blood units for patients at risk;
- in clinical terms, leucodepletion not only prevents and reduces the risk of viral reactivation/transmission in the recipient but is also effective in preventing febrile non-Hodgkin lymphocytosis (FNH), platelet refractoriness and acute graft-versus-host reaction (GvHD), above all in immunosuppressed patients.

The frequency of CMV infections and the reactivation of previous infections varies from country to country. Although Italian law does not require the performance of the test for screening anti-CMV antibodies, we think it is an in case useful, in our context, to continue to support this type of approach, as it has three positive effects:

- the use of seronegative blood units for patients at risk;
- the identification of blood units with a high risk of transmitting the infection;
- the availability of new seronegative donors in particularly urgent cases.

REFERENCES