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Probability of viral hepatitis markers detection in potential hematopoietic stem cell donors

Liudmila N. Bubnova, Tatiana A. Matveeva, Irina E. Pavlova, Tatiana V. Glazanova

Russian Research Institute of Hematology and Transfusiology, Federal Medico-Biological Agency, St. Petersburg, Russia

Contact: Dr. Tatiana V. Glazanova, e-mail: tatyana-glazanova@yandex.ru

Introduction

Regular blood donors often become hematopoietic stem cell (HSC) donors as well. One of their advantages as donors is the fact that they have already passed a screening for blood-borne infections markers, most common of which are hepatitis B and C. Blood banks employ most sensitive modern diagnostic techniques including NAT and are able to screen even for early stages of infections. We performed a comparative analysis of hepatitis B and C markers frequency in various categories of blood donors, which are also candidates for HSC donor registry recruitment.

Materials and methods

Our study included 56,135 of regular FSBI RNIHT FMBA blood donors and 16,240 first-time applicants for donation screened in 2000-2019. All of them were examined for bloodborne infections markers. The investigation extent and procedure, including diagnostic reagent specification, are regulated by Russian Federation Ministry of Health and Chief sanitary doctor's orders. All blood donor donors were evaluated for hepatitis B, hepatitis C, HIV and syphilis markers *via* ELISA or immunochemiluminescent analysis using the Architect I 2000 SR automatic immunochemical analyzer. Since 2013 all blood donors has been examined for hepatitis B, hepatitis C and HIV nucleic acids presence with a help from a fully automated PCR-complex Cobas s201 system. The 2020-2021 donor survey results are not included in the analysis due to the changes introduced into donor department's procedures during COVID-19 pandemic.

Results

Among the regular FSBI RNIHT FMBA donors examined the viral hepatitis B markers incidence gradually decreased

from 0.1% in 2000 to an average of 0.03% with no marker carriers found in some of the years. The hepatitis C markers were seen more often with 0.3% incidence in 2000 with subsequent average rate of 0.15% among subjects examined. Among the first-time donors the incidence of markers for both viruses was more significant with hepatitis B found in 1.3% in 2000 and then slightly decreasing to a rate of 0.5%, and hepatitis C markers been positive in 3.7% potential donors in 2000 and then seen in an average of 1.2% cases. From 2015 to 2019, the overall hepatitis markers positivity rate was 0.08% in regular donors and 1.4% in first-time ones, which demonstrates a slight general decrease infection frequency. In both blood donor groups the hepatitis C detection rate notably exceeds one for hepatitis B being about threefold higher.

Conclusion

Assumingly healthy people applying as candidates for donation are, nonetheless, infected in about 2% of cases (these figures are even higher in endemic regions) and are not accepted for donation due to bloodborne infections markers presence. A similar proportion of all potential first-time donors are likely to fail to become HSC Registry donors as well. In this regard, the donor social background, motivation and thorough questioning are of particular importance.

Keywords

Registry, hemopoietic stem cells, donors, bloodborne infections, hepatitis.

Оценка вероятности выявления маркеров вирусных гепатитов у потенциальных доноров гемопоэтических стволовых клеток

Людмила Н. Бубнова, Татьяна А. Матвеева, Ирина Е. Павлова, Татьяна В. Глазанова

Российский научно-исследовательский институт гематологии и трансфузиологии Федерального медико-биологического агентства, Санкт-Петербург, Россия

Введение

Регулярные доноры крови часто становятся также и донорами для регистров гемопоэтических стволовых клеток (ГСК). Одним из преимуществ таких доноров является обследование на наличие маркеров гемотрансмиссивных инфекций. Наиболее распространенными среди этих инфекций являются вирусные гепатиты В и С, для диагностики которых в службе крови применяются современные диагностические методики, обладающие максимальной чувствительностью, в том числе NAT – технологии, позволяющие выявить инфекцион-

ный агент на ранней стадии. Мы выполнили сравнительный анализ частоты встречаемости маркеров гепатитов В и С у доноров крови различных категорий, являющихся контингентом, пополняющим регистр потенциальных доноров гемопоэтических стволовых клеток (ГСК).

Материалы и методы

В исследование включены 56135 регулярных доноров крови ФГБУ РосНИИГТ ФМБА России, и 16240 лиц, впервые обратившихся для сдачи крови в донорский отдел института, в 2000-2019 годах. Всем им было