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P-303

PREVALENCE AND DEMOGRAPHIC DETERMINANTS OF HEPATITIS B VIRUS IN FIRST-TIME U.S. BLOOD DONORS, 2004-2009

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Background: Hepatitis B virus infection (HBV) is the most common blood-borne pathogen worldwide and can cause chronic hepatitis, cirrhosis and hepatocellular carcinoma. HBV vaccination has been instituted in all children in the USA during the 1990's, but its effects upon blood safety are unknown. Tracking HBV prevalence in blood donors is also important for identification of high risk groups and may be useful for public health surveillance.

Aims: To analyze HBV prevalence among contemporary, first-time US blood donors.

Methods: This was a cross-sectional seroprevalence study of all non-autologous, first-time blood donors at Blood Systems Incorporated blood centers in calendar years 2004 through 2009. Chronic HBV infection was represented by HBsAg antigenemia, defined as reactive HBsAg EIA, reactive neutralization or ChLIA assay, and positive anti-HBcore EIA. Past exposure to HBV was represented by anti-HBcore seropositivity, defined as reactive anti-HBcore EIA. Subgroup prevalence and secular trends were explored and demographic risk factors were analyzed using multivariable logistic regression.

Results: Among 1,607,736 first time donors who presented during 2004-2009, 766 (4.8 per 10,000) had HBsAg and 14,101 (87.7 per 10,000) had anti-HBcore. There were significant downward trends in both HBsAg (5.8 per 10,000-3.9 per 10,000) and anti-HBcore (110.6 per 10,000-63.9 per 10,000) from 2004 to 2009 ($P_{trend} < 0.0001$). Older and male Asians, and Black males aged 20-29 had the highest HBsAg prevalences. In multivariable logistic regression, HBsAg was associated with older age and male sex, Asian (OR = 43.88, 95% CI 34.96-55.06) and Black (OR = 7.79, 95% CI 6.15-9.87) race/ethnicity, South eastern region (OR = 2.21, 95% CI 1.75-2.77 vs the Southwest) and lower educational attainment (OR = 2.34, 95% CI 1.85-2.96 for high school or lower vs bachelor/master degree). Anti-HBcore showed generally similar associations, although the age-related increases were steeper while race and education effects were less accentuated.

Conclusions: The prevalences of both chronic and past HBV infection are declining among first time blood donors in the USA, likely due to universal vaccination of newborns and a birth cohort effect as older, higher prevalence persons are less likely to become first time donors. Our results confirmed previous demographic associations with HBV infection, but our findings of higher HBsAg prevalence in young black males and in the South eastern USA were surprising and require further investigation.

P-304

SURVEILLANCE FOR OCCULT HBV INFECTION AND HBSAG VARIANTS IN BLOOD DONORS

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Background: Occult hepatitis B virus infection (OBI) poses a threat to the blood supply. Individuals with OBIs are defined as those in whom viral DNA is detected in liver or blood by nested PCR or real-time PCR but in whom HBsAg is undetectable in serum by current commercial HBsAg assays. Occult HBV infection status can be associated with mutant viruses undetectable by current HBsAg assays, which has been confirmed by many researches. The clinical epidemiology of blood donor OBIs is not known in China, and the present study attempted to determine the clinical and molecular characteristics of these infections.

Aims: To clarify the epidemiology of blood donor OBIs and the molecular characteristics of these infections in China.

Methods: Blood samples were obtained from unpaid blood donors from Xiamen, China from 21 February 2011 to 31 May 2011. Samples were firstly tested with HBsAg and anti-HBcAb assay kits. Anti-HBcAb positive/HBsAg negative samples and HBsAg positive samples were both subjected to HBV nested-PCR assay. PCR products were sequenced on an ABI Prism 3130X automatic genetic analyzer (Applied Biosystems), and phylogenetic analyses were performed by the neighbor-joining method (MEGA software, version 3.1).

Results: Nine thousand one hundred and eighty-eight blood samples were assayed, in which 29 were HBsAg positive and 9159 negative. Eighteen (0.21%, 95% CI: 0.11-

0.30%) in the 9159 HBsAg negative samples were found to be positive for the presence of HBV DNA. 'A' epitope sequences were obtained from 14 among them. Mutation(s) in aa 124-aa 147 exists in 6 (42.9%, 6/14) samples and 4 (66.7%, 4/6) were G145R mutation, but none in HBsAg positive ones. Ratio of genotype C in OBI donors (10/18) is statistically higher than HBsAg-positive donors (1/15, $P < 0.01$).

Conclusions: Our result suggests that there is a high proportion of occult hepatitis B virus infection in blood donors in south China. Specific mutations occurred with high frequency in 'A' epitope in strains from OBI donors, especially as G145R mutation. HBV genotype C may lead to occult infection more easily according to our data.

P-305

THE PREVALENCE OF HBSAG AND ANTI-HCV IN BLOOD DONORS OF TIRANA

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Background: Albania is a country with a high prevalence of viral hepatitis B in general population, and this is reflected also in our donor population. Our donor population is changing every year, because voluntary non-remunerated blood donors are increasing every year.

Aim: To analyze the prevalence of viral hepatitis in our donor population in order to reveal changes related to continuous changing of our donor population resulting in more voluntary non-remunerated blood donors.

Methods: Data of 5-year first-time donations (67,985) were reviewed for the prevalence of HbsAg and anti-HCV. From this total of donations there were 48,949 donations (72%) coming from male donors and 19,036 from female donors. Data were analyzed with respect to age, sex, and type of donor family replacement (FR) and voluntary non-remunerated blood donors (VNRBD). All donors were divided in age groups 18-30 (28.5%), 30-50 (60.6%), 50-60 (10.9%).

Results: Data are shown in the following table:

During these 5 years the donation figures have changed significantly in our country. In 2007 we had 69% FR, 19% VNRBD and 14% paid donations. In 2011 we had 67% FR donations, 28% VNRBD donations and only 3% paid donations. Paid donations were not included in this analysis because they are all regular donors. No more first time paid donors are accepted. There is no significant change in anti-HCV prevalence during these years and no difference related to sex and age group was revealed. There is a significant decrease in the prevalence of hepatitis B in total donor population and also in each group (FR and VNRBD). No relation of HBsAg and donor sex was found whilst there is a significant change in the prevalence of HBsAg in donors of 18-30 years old group (4.1% compared to 30-50 years old group (9.2%). This difference might be due to the program of vaccination that has begun in our country in the early 90's. This might be also the reason why in VNRBD we found significantly lower prevalence of HBsAg compared to FR because most of our VNRBD (68%) come from the age group 18-35 years old. Another reason might be also the fact that in the VNRBD group more donors were excluded during donor interview (for jaundice history 2.5% vs 0.5%) compared to family replacement donors.

Table 1: HBsAg and anti-HCV in donor population of Tirana

| Donations/year | | HBsAg (in%) | HCV(in%) |
|-----------------|--------------|-------------|----------|
| 2007 (10733) | FR (8403) | 8.7 | 1.2 |
| | VNRBD (2330) | 6.8 | 0.9 |
| 2008 (11101) | FR (8623) | 8.8 | 0.9 |
| | VNRBD (2478) | 7.0 | 0.6 |
| 2009 (14062) | FR (10423) | 8.5 | 1.1 |
| | VNRBD(3639) | 6.6 | 0.9 |
| 2010 (15121) | FR (11168) | 8.3 | 1 |
| | VNRBD (3953) | 5.5 | 0.6 |
| 2011 (16968) | FR (12061) | 6.7 | 0.9 |
| | VNRBD (4907) | 4.7 | 0.6 |

Conclusion: The fact that viral hepatitis prevalence is decreasing in our donor population might be due to the fact that we are continuously increasing our VNRBD. More

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