

Transmission of Human Immunodeficiency Virus by Transfusion of Anti-HIV Screened Blood

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เรื่องย่อ

การติดเชื้อไวรัสภูมิคุ้มกันบกพร่องมนุษย์จากเลือดที่ตรวจสอบแล้ว

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ภาควิชาอายุรศาสตร์ คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่ อ.เมือง จ.เชียงใหม่ 50002

ในประเทศไทยมีผู้ติดเชื้อไวรัสภูมิคุ้มกันบกพร่องมนุษย์จากเลือดที่ตรวจสอบแล้ว เท่าที่มีผู้รายงานประมาณ 50 คนแล้ว ผู้ที่ติดเชื้อแต่ไม่ได้มีการรายงานคงมีจำนวนมากกว่านี้มาก ในบางจังหวัด เช่น แม่ฮ่องสอน ผู้รับเลือดมีความเสี่ยงใกล้เคียงกับประเทศด้อยพัฒนาในทวีปอาฟริกา สาเหตุสำคัญเกิดจากการที่อัตราการติดเชื้อในกลุ่มผู้บริจาคโลหิตสูงมาก แม้จะได้รับการตรวจสอบโดยน้ำยาที่ดีและทันสมัยที่สุด ก็ไม่สามารถจะให้ความปลอดภัยได้สูงดังประเทศที่พัฒนาแล้ว รัฐบาลต้องให้ความสนใจและจัดสรรทรัพยากรเพื่อรณรงค์ให้มีผู้บริจาคโลหิตมากขึ้น โดยเฉพาะอย่างยิ่งผู้บริจาคโลหิตกลุ่มที่ไม่มีพฤติกรรมเสี่ยง เช่น กลุ่มสตรีสูงอายุ เป็นต้น (วารสารโรคติดเชื้อและยาด้านจุลชีพ 2537;11:99-101.)

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The report by Santibhavank in this issue of the Journal (1) added two more cases of transmission of human immunodeficiency virus (HIV) by transfusion of screened blood. The number of cases already reported from Thailand is close to 50 (2-11). These cases are obviously the *tiny* tip of an *enormous* iceberg. In Thailand, about 800,000 units of blood are transfused annually. How many recipients of these 800,000 units have an HIV serology test done before and after transfusion ? The answer is none or very few.

What is the risk of acquiring HIV infection by transfusion of screened blood ? Table 1 shows this risk (which is usually referred to as *residual risk*) in some

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Table 1 : Residual risk for HIV infection from blood transfusion.

Country (town)	Risk per 100,000 units	Reference
Germany	0.003-0.02	12
France	0.017	13
U.S.A.	0.16	14
U.S.A.	0.17	15
Italy	0.2	16
U.S.A.	0.28	17
Thailand*	5.7	18
Thailand (Chiang Mai)	18.5	18
Thailand (Mae Hong Son)	100	18
Ivory Coast (Abidjan)	54-106	19

* A median figure for the whole country

countries in Europe, North America, Africa and Thailand. In most cases, the risk was estimated using a statistical model. Only in very few cases had the risk been quantified in a prospective study (15). The residual risks in Europe and North America are lower than the African and Asian countries. (The French Minister/Germany face the public pressure by this issue) To illustrate the gravity of this problem in Thailand, the residual risk of 5.7 per 10,000 units of blood transfused means that a child who receives 20 units of platelet concentrate (say, for dengue hemorrhagic fever) will have a 1 in 100 chance of acquiring HIV infection. What are the causes of these high residual risk and what can be done to reduce it ?

The two important factors of residual risk for HIV infection from blood transfusion are the "window period", and the limitation in anti-HIV test sensitivity. Donation of blood in the "window period" (before the antibody developed) is one factor causing the residual risk. In Thailand, which is in the "ascending limb" of the HIV epidemic, the prevalence of *early* infection can be expected to be high, and the "window period" factor is highly significant. Screening for both HIV antibody and antigen may provide partial answer to this problem. For every 10,000 donation in Bangkok, 1-2.9 units were found to be antigen positive and antibody negative (20,22). Theoretically, HIV antigen has its own "window period" and the cost effectiveness study of HIV antigen screening in Thailand are going on in selected hospital (21). At this time, HIV antigen testing combined to the third generation anti-HIV testing in donated blood have been implemented in some hospitals.

The several HIV immunosorbent assays (ELISA) that are licensed for screening donors vary in their sensitivity from 97.8% to 99.5% (23-26). They are among the most sensitive tests available to the medical profession. However, the effectiveness of these tests to screen out HIV-infected blood (usually referred to as the "predictive value of negative)" depends not only on their sensitivity but also on the prevalence of HIV infection among the donor population that the tests are applied to. The higher this prevalence is, the lower the effectiveness of the tests will be. This is the main reason for the low residual risk in U.S.A., where the prevalence of HIV infection among the donor population was 0.008% (27), and the high residual risk in Thailand, where the median prevalence for all the provinces was 0.9% in December 1992. Testing for HIV antigen does not have any role in diagnosing an *established* infection. The ultimate

solution is to decrease the prevalence of HIV infection among the donor population. This will increase the predictive value of negative of the antibody screening test as well as decrease the number of donation in the "window period". The procedures designed to exclude donors at high risk of HIV infection include 1. exclusion by blood banks of identifiable high risk groups *e.g.* prisoners, paid donors, etc., 2. donor self exclusion, and 3. confidential unit exclusion (6). These non-testing procedures were estimated to eliminate 49 out of every 50 donors likely to be HIV infected (28). Because exclusion by blood banks and donor self exclusion will disqualify a large number of potential donors, non-testing procedures require that a large and stable pool of donors be established in every province. Because of past and present inequality in resource allocation, no large and stable pool of blood donors has ever been established outside of Bangkok. In the upcountry environment, the non-testing procedures might be so difficult today, and limited man-power is also the problem. Human errors in the over workload and non-systematized laboratory have to be reconsidered. These problems have to be solved by the national quality assurance program. Sawanpracharak Hospital is only one hospital which revealed the problems. Yet the scarcity of blood donors was evident in the fact that "replacement blood" had to be used in Santibhavank's second case (1). "Replacement blood" (blood donated from patient-recruited donors) is usually obtained from professional paid donors.

Politicians, bureaucrats, and community leaders should be informed of the unacceptably high residual risk for HIV infection from blood transfusion. They should be encouraged to work towards assembling a large and stable pool of donors in their community. Innovative strategies *e.g.* those aiming at recruiting low risk donors, hiring professional public relation specialist for regular donor promotion, *etc.* should be considered. Equitable resource allocation for provinces other than Bangkok should be sought. Assembling a large and stable pool of low-risk donors is the *only* way to minimize the residual risk for HIV infection from blood transfusion.

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