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## Transfusion-transmitted Syphilis in Teaching Hospital, Ghana

**To the Editor:** Transfusion-transmitted syphilis, which is caused by *Treponema pallidum* subspecies *pallidum*, is one of the oldest recognized infectious risks of blood transfusion (1). Routine screening of blood donors and refrigeration of donated blood before its use has resulted in only 3 reported cases of transfusion-transmitted syphilis over the past 4 decades (2–6).

The World Health Organization recommends screening all donated blood for syphilis (7), but doing so is challenging for many developing countries. Many blood banks in low-income countries, including Komfo Anokye Teaching Hospital in Kumasi, Ghana, do not screen donated blood for syphilis.

This study was conducted at Komfo Anokye Teaching Hospital. The purpose of this study was to determine the prevalence of syphilis among blood donors and whether seroconversion occurred in transfusion recipients. The study was approved by the ethics committees in Kumasi, Ghana, and Liverpool, UK.

Pretransfusion plasma samples from 200 conscious transfusion recipients in adult, pediatric, and obstetric inpatient departments and samples of their transfused blood were tested for syphilis. A positive initial result by enzyme immunoassay (EIA) (Bioelisa Syphilis 3.0; Biokit, Barcelona, Spain) was confirmed by using a *T. pallidum* hemagglutination assay (TPHA) (Syphagen; Biokit). A rapid plasma reagin (RPR) assay (RPR Reditest; Biokit) was used to determine whether seropositivity was caused by recent infection. Seronegative recipients who had received seropositive blood were retested 30 days posttransfusion to identify seroconversions. All donors and recipients with recent infections were offered counseling and treatment in accordance with national guidelines.

A total of 145 (73%) blood donors were male, and 109 (57%) units of blood had been stored for <4 days. Sixteen units (8%, 95% confidence interval [CI] 4.3%–11.7%) were seropositive for syphilis by EIA and TPHA. Of these units, 7 (44%) were RPR reactive, which indicated a prevalence of recent infections of 3.5% (95% CI 1.0%–6.0%) (Table). Twenty-six transfusion recipients (13%; 95% CI 8.3%–17.7%) were seropositive by EIA and TPHA. Of these recipients, blood samples from 9 (35%) were RPR reactive, indicating a prevalence of recent infection of 4.5%.

One recipient, an 8-year-old girl with severe malarial anemia (recipient 10), showed seroconversion after receiving an RPR-reactive unit of blood that had been refrigerated for only 1 day before being issued for

Table. Characteristics of 16 recipients of syphilis-positive blood transfusions, Kumasi, Ghana\*

Recipient ID	RPR results for transfused blood	Duration of blood storage, d	Blood sample test results						Outcome
			Pretransfusion			Posttransfusion			
			EIA	TPHA	RPR	EIA	TPHA	RPR	
1	R	12	–	ND	ND	NA	NA	NA	Died
2	NR	2	–	ND	ND	NA	NA	NA	Died
3	NR	2	–	ND	ND	NA	NA	NA	Died
4	NR	1	–	ND	ND	NA	NA	NA	Died
5	R	4	–	ND	ND	NA	NA	NA	Lost to follow up
6	NR	1	–	ND	ND	NA	NA	NA	Lost to follow up
7	NR	2	+	+	NR	NA	NA	NA	Not followed up
8	NR	6	+	+	R	NA	NA	NA	Not followed up
9	NR	3	–	ND	ND	–	ND	ND	Well
10	R	1	–	ND	ND	+	+	R	Seroconverted
11	NR	2	–	ND	ND	–	ND	ND	Well
12	R	1	–	ND	ND	–	ND	ND	Well
13	R	3	–	ND	ND	+	–	NR	Well
14	NR	2	–	ND	ND	–	ND	ND	Well
15	R	1	–	ND	ND	–	ND	ND	Well
16	R	4	–	ND	ND	–	ND	ND	Well

\*ID, identification; RPR, rapid plasma reagin; EIA, enzyme immunoassay; TPHA, *Treponema pallidum* hemagglutination assay; R, reactive; –, negative; ND, not done; NA, not available; NR, not reactive; +, positive. All results for transfused blood tested by EIA and TPHA were positive.

use. Posttransfusion fever developed in this recipient, who responded to treatment with cefuroxime and gentamicin, although results of blood culture for bacteremia and peripheral blood film for malaria parasites were negative. She had no relevant sexual history, had been febrile after the transfusion, and showed no evidence of mucocutaneous lesions or lymphadenopathy at her follow-up visit 1 month after the transfusion. She was referred to pediatricians for treatment of syphilis.

This recipient who showed seroconversion most likely had a case of transfusion-transmitted syphilis. Other treponemal infections such as yaws cannot be differentiated serologically from syphilis, and a diagnosis of yaws is based on clinico-epidemiologic features (8); however, yaws is not endemic to Kumasi, and because this child had no clinical evidence of yaws, this disease is unlikely to be the cause of the seroconversion.

Refrigeration of units of blood for  $\geq 5$  days kills *T. pallidum*, but 57% of the donated blood in this study was stored for  $<4$  days before use. This situation prevails across many blood

banks in sub-Saharan Africa where, because of inadequate supply and high demand, blood is used as soon as it becomes available. Such short periods of blood storage do not provide an adequate margin of safety against transfusion-transmitted syphilis. Findings from this study have been discussed with the hospital transfusion committee, and new syphilis screening guidelines and testing algorithms are being developed.

The high prevalence of syphilis seropositivity in blood donors and seroconversion of a transfusion recipient shows that in centers where screening is not conducted, recipients of blood transfusions are at risk for contracting transfusion-transmitted syphilis. This finding is likely in blood banks that have a high demand for blood and where blood is stored only for a few days. This study highlights transfusion-transmitted syphilis as a serious public health issue in developing countries and demonstrates that screening of donor blood for syphilis should be conducted.

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## Congenital Syphilis, Réunion Island, 2010

**To the Editor:** Syphilis, caused by the bacterium *Treponema pallidum*, is primarily a sexually transmitted infection, but *T. pallidum* can also be transmitted by infected pregnant women to their children. Every year, at least 500,000 children are born with congenital syphilis (CS); maternal syphilis causes another half million stillbirths and abortions, usually in countries with limited resources (1). However, CS has been recently found in industrialized countries such as the United States, where the CS rate increased by 23% during 2005–2008, after a 38% increase in the syphilis rate among US women and girls during an earlier period (2004–2007) (2).

Réunion Island, a French overseas territory with 810,000 inhabitants, has a health care system similar to that in continental France. Neither syphilis infection, CS, nor other trepanomatoses (yaws) is notifiable. Since 2006, an increase in early syphilis was documented, first in men who have sex with men infected with HIV and second in the general population.

In 2009, we conducted a retrospective study by using data from 2004–2009 to document the situation of CS on the island. Data from all public (n = 4) and private (n = 2) hospitals on the island with neonatology and obstetrical departments were investigated. Birth deliveries at home were not included. Inclusion criteria were positive specific (*T. pallidum* hemagglutination assay) and nonspecific (Venereal Disease Research Laboratory [VDRL]) test results for *Treponema* spp. among children <2 years of age during 2004–2009. Additionally, hospitalized children coded as having congenital syphilis (International Classification of Diseases [ICD] 10 codes A50.0 to A50.9) in the French national hospital database were included. After reviewing medical files of mothers and their children, cases were classified as confirmed or probable CS according to the case definition of the Centers for Disease Control and Prevention (2).

Eighteen children had positive syphilis serologic results by *T. pallidum* hemagglutination assay and VDRL tests, according to the selection criteria. Among these 18 test results, 7 were classified as probable CS (late treatment for mother or symptoms linked to CS), 3 in 2008 and 4 in 2009 (Table). The male:female sex ratio was 0.75. Five case-patients were preterm newborns; 3 of the most premature babies had signs linked to CS, such as hepatosplenomegaly, cutaneous mucosal signs, neurologic signs, radiographic signs of CS in long bones, edema, and biologic anomalies. All

were screened for *T. pallidum*-specific IgM by using fluorescent treponemal antibody absorption or IgM capture ELISA from immediately after birth to 15 days old. Two case-patients had positive results; 1 was symptomatic. Six of the 7 children who had probable CS received appropriate penicillin G treatment, except for 1 asymptomatic baby for whom long-term medical supervision was recommended by the pediatrician. Survival rates at 3 months of age reached 100%.

Median age of mothers at delivery was 22 years. All mothers were natives of Réunion Island except 1 who was born in Madagascar and received no antenatal follow-up. Medical history indicated previous genital herpes for 3 women. Social difficulties or alcohol consumption were reported for 3 women. The mean age of gestation at which the first syphilis screening was conducted was 23 weeks (5–33 weeks). Two mothers were symptomatic. Syphilis was diagnosed after delivery for 3 mothers; seroconversion occurred during the pregnancy. Except for missing data on 1 mother, all mothers were HIV negative.

In Réunion Island, in our retrospective review, we found 7 CS cases during 2008–2009 but none during 2004–2007. The incidence rate of probable CS cases was estimated to be 28 cases per 100,000 live births during 2009. However, results may have been underestimated because not all parturients with a positive syphilis test result and fetal deaths were investigated. Meanwhile, a fetal death at 30 weeks was reported during the investigation but not included in the selection criteria. The Centers for Disease Control and Prevention definition of CS based on maternal status can also lead to an overestimation. Late screening of syphilis in mothers, lack of antenatal follow-up, higher VDRL titer, or unknown stage of the disease at time of diagnosis have already been described in other studies (3–5).