Unsafe injections 1985-1990

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GTZ Projet SIDA (HIV, AIDS, Safe Blood Transfusion)
Kinshasa 1987-1991

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The History of Projet SIDA

Cohen J: Rise and Fall of Projet SIDA, Science 28.11.1997, 278(5343):1565-1568

Kinshasa, Democratic Republic of the Congo: It’s easy to see that many things are missing from Kinshasa General Hospital. Overcrowding is so severe that some patients are forced to share a bed. People are rolled around on World War I-vintage wheelchairs that have only three wheels. Holes in the walls mark the places where electrical boxes have been torn out. Tiles have fallen from the walls and are missing from parts of the floors. In the plaza that separates the wards, multicolored lizards crawl over charred wooden stumps, the remnants of trees that once provided much-needed shade. Except for the cellular phones owned by some doctors, there is no communications system. But there is one, less obvious, thing missing

that a decade ago made this hospital, then known as Mama Yemo, a focal point for scientists from Europe, the United States, and Africa: AIDS research.

Mama Yemo Hospital was a critical component of Projet SIDA (French for AIDS Project), a Zairian-American-Belgian research program that began in 1984 and quickly shed much light on the emerging epidemic. “The epidemic of AIDS, not only in Africa but in other parts of the world, became known because of the work here,” says cardiologist Bila Kapita, who helped establish the Zairian side of the collaboration. “And many Zairian doctors learned how to do research.” Says Claudes Kamenga, who worked with the program for 5 years and is an epidemiologist in the behavioral research unit at Family Health International in Arlington, Virginia, “Zaire was shining because of Projet SIDA.”

To the dismay of many scientists, however, Projet SIDA suddenly ended in 1991, a victim of the civil unrest that tore Zaire apart in the 1990s. The machine-gun fire that rang through the city that September led to the project’s demise and signaled the beginning of the end for Zairian dictator Mobutu Sese Seko, who finally was ousted from power last May. Today, says Kapita, with a mixture of sadness, frustration, resignation, and finality, “Projet SIDA is dead.” As Eugène Nzilambi Nzila, a key clinician in the project from its outset, says: “We don’t think about research now.”

Outsiders who launched and ran Projet SIDA provide a glowing eulogy. “It’s one of the things I’m really proud of in my life—that I contributed to this project and made it happen,” says Belgian epidemiologist Peter Piot, who now heads UNAIDS, the United Nations AIDS program. James Curran, former acting director of the Division of HIV/AIDS Prevention of the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta, the project’s main funder, calls his involvement “a tremendously enlightening experience.” Says Curran, now head of Emory University’s School of Public Health in Atlanta: “During many of its early years, it was the preeminent AIDS research project in Africa in terms of number of people involved and quality of research coming out.” Thomas Quinn of the U.S. National Institute of Allergy and Infectious Diseases (NIAID), another key contributor to the project, says, “The number of papers we generated out of there was just incredible.”

But, in spite of its many accomplishments, Projet SIDA—which at its peak had a $4 million annual budget—also provided some object lessons in the

difficulties of conducting research in poor, conflict-ridden countries, where the scientific objectives of the studies don’t always mesh with urgent public health needs. It also left behind an unexploited legacy: a vast accumulation of blood samples from patients—some of whom are still being followed today—that could offer valuable insights into preventing and treating the disease. And it left in its wake trained medical investigators and technicians who, like Kapita and Nzila, would love to do research once again. “We in Congo are at the heart of the problem,” says Kankienza Muana’mbo, head of the National Institute of Biomedical Research (INRB), which once housed a main Projet SIDA lab. “We have human beings and we have biological materials, but we don’t have fresh resources to look at the problem. And we think that doing research here in Congo can bring some solutions for the whole world.”

Spreading HIV/AIDS research

Turn back the clock to the summer of 1983. HIV had just been isolated, but scientists had yet to prove conclusively that it caused the disease. AIDS itself, which had first been recognized 2 years earlier in Los Angeles, was labeled a disease of “the four H’s”: homosexuals, heroin addicts, hemophiliacs, and Haitians. Mosquitoes were still a suspected vector of AIDS. And the impact of the disease on the African continent had yet to be described. One afternoon that summer, Quinn and NIAID then-director Richard Krause met at a cafe in Vienna with Piot, who at the time was with Belgium’s Institute of Tropical Medicine (ITM). The topic of discussion: hints from a variety of sources that AIDS had struck Zaire.

Piot had seen Zairian patients at the ITM who had AIDS. “I was dying to go to Kinshasa and see what was going on, but I didn’t have the money,” says Piot. And Quinn and Krause had recently returned from Haiti, where they learned that many Haitians had worked in Zaire after it became independent from Belgium in 1960, and then were forced out in the ’70s. “With that history I said, hey, we’ve got to get into Zaire,” recalls Krause, now a scientific adviser at the Fogarty International Center, a branch of the U.S. National Institutes of Health (NIH). They decided there and then to form a collaboration. “I was committed to devoting substantial funds to that,” says Krause.

The trio met again that fall in Belgium to map out the collaboration. They were joined by the CDC’s Joseph McCormick, who had much experience working in Zaire and had independently received official clearance to investigate

AIDS there. On 18 October, Piot, McCormick, and Quinn set out for Kinshasa. “Our first problem,” says Piot, “was to see whether we were welcome or not.” They met with the minister of health, who, says McCormick, spelled out all the other diseases plaguing Zaire. “He said, ‘You’re welcome to go look, but this is not going to take on any priority.’” They took that as a green light to meet with Kapita, who then was head of internal medicine at Mama Yemo. “It’s really thanks to him that the whole project could start,” says Piot.

Not only did Kapita welcome the foreigners, he also deeply impressed them with his independent observations about AIDS, taking them around the wards of Mama Yemo and pointing out patients who he thought had the disease. Analyses of these patients‘ immune cells proved Kapita right. Says Quinn: “He’s probably one of the first Africans to recognize the disease.” The work, which was published in the 14 July 1984 Lancet, also helped clarify the importance of heterosexual spread of the disease. As the authors wrote, “The findings of this study strongly argue that the situation in central Africa represents a new epidemiological setting for this worldwide disease—that of significant transmission in a large heterosexual population.”

In the winter of 1984, the project gained what ended up being a major source of support when CDC epidemiologist Jonathan Mann, a newcomer to AIDS research, visited Piot in Belgium. At the time, Piot was writing a grant proposal to NIAID to launch a joint project. Much to Piot’s surprise, Mann said CDC was planning to launch its own project. “Being a pragmatic guy, I said let’s work together and see how we can collaborate,” says Piot. CDC became the project’s major funder: Of its final $4 million budget, roughly $2.5 million came from CDC, $1 million from NIAID, and $0.5 million from ITM.

Projet SIDA officially began in June 1984 with Mann at its head. In the beginning, it consisted of Mann and two Zairian physicians, Bosenga Ngali and Nzila. Mann emphasizes that they contributed significantly to the direction the nascent project took. “Nzila and Ngali didn’t hesitate to say what they thought,” says Mann. “We were in a canoe. And we were all paddling.” They soon were joined by NIAID’s Henry “Skip” Francis, who ran the project’s lab, and ITM’s Bob Colebunders, who headed the clinical work.

In short order, Projet SIDA began addressing the most fundamental of epidemiological questions: How many people were infected? Who got the

disease? Was AIDS the same in Zaire as seen elsewhere? Could mosquitoes transmit HIV? The project also helped the country come to terms with its epidemic. “We were living through the time when the government [went from] denying the problem to accepting the problem and dealing with it,” says Francis, who now is the chief of clinical medicine at NIH’s National Institute on Drug Abuse. “Jon Mann was politically eloquent and could get the message out without frightening people.” And Zaire’s response to AIDS caught the attention of its neighbors, says Colebunders, who is now back at ITM: “It’s because of Projet SIDA that the other countries started to talk about AIDS.”

In 1985, Mann recalls attending the first international AIDS conference, held in Atlanta, with Kapita, who had never been to the United States before. “There was such a good feeling of working together,” says Mann. “It was really a new world and we were in it together. In the beginning, we were all discovering everything everyday.”

Grand aspirations and limitations

Mann left in 1986 to head the World Health Organization’s new Global Program on AIDS. He was replaced by Robin Ryder, an epidemiologist who had previously worked in The Gambia. During Ryder’s 4-year stint, Projet SIDA branched into many new areas, employing nearly 300 people—only seven of whom were expatriates. In all, says Ryder, who’s now at Yale University, Projet SIDA had more than 20 Landcruisers, a better computer system than the one used by the CDC, and state-of-the-art machines that could separate one type of immune system cell from another. “It was a research factory,” says Quinn. Ryder says 15 or so Zairian physicians were the “backbone” of the project. “It was sort of like a plant when you give it water and it really perks up,” says Ryder. “They just thrived.”

A steady stream of scientific insights began to flow from the program, which now included a clinic devoted to the study and treatment of prostitutes. With help from ITM’s Marie Laga, Projet SIDA proved that preventing and treating sexually transmitted diseases (STDs) decreases the incidence of new HIV infections. Careful investigations of HIV-infected pregnant women documented the rates of transmission to their infants and attempted to explain why the majority of babies remained virus free. Projet SIDA also rigorously measured both the prevalence of HIV and the rate of new HIV infections in thousands of people, critical work for establishing “cohorts” that can participate in vaccine trials. To date, more than 120

publications have come from Projet SIDA, and more than 1000 abstracts have been presented at scientific meetings.

Yet Projet SIDA was not, in Piot's words, "a honeymoon." One source of unease was the Zairian government. In 1986, at the second international AIDS conference in Paris, Kapita gave an address about AIDS in Africa at the opening plenary session. A quiet and modest man, Kapita was deeply honored by the opportunity. But after he spoke, a Zairian doctor came up to him with a warning. "You think you're here to be a star," Kapita recalls being told. "You must know that all you're telling here is being transmitted to Kinshasa. We're waiting to decide what to do with you."

When Kapita returned to his office at Mama Yemo Hospital, an officer from the Ministry of Health was there waiting, with instructions to take him to prison. Fortunately, a friend in the ministry intervened, and Kapita says he never faced political problems again. But the episode underscores that the difficulties facing AIDS researchers in Zaire went far beyond struggling to find a working phone line or a clean pair of latex gloves.

For many Projet SIDA members, the problems intensified over time. "There were lots of fights," acknowledges Piot. Oddly, the main battles had little to do with Zaire; instead, they broke out between NIH and CDC.

Tensions between these two research heavyweights, both of which are part of the U.S. Department of Health and Human Services, surfaced from the moment Mann first set up shop in Kinshasa. "Since he spoke fluent French, he had everything worked out with the minister of health that CDC was in charge," recalls one NIH insider who asked not be named. "That really pissed off NIAID because it was our idea." Piot says he stayed clear of the power brokering: "I never understood the politics. For me. it was not a real problem. … And after all, CDC has more field experience than NIH." But the rift between the American agencies was real—and it grew, complicating the difficult decisions that had to be made about research priorities.

By the time Ryder took over, the wrangling had become more than a nuisance. "It was the bane of my existence," says Ryder. "I never had problems with the Africans." According to Ryder and others, a difference in outlook between the two U.S. agencies fueled the conflict. "People from the CDC were ready to think big, big, big. But 'big big big' means there are lots of lab samples to be tested, and NIH ran the lab. So there was some real push and shove because they'd say, 'You can do the study, but we're not

going to do the lab work.’” The NIAID researchers had their own projects that they wanted to pursue, Colebunders and others explain. “They wanted to do more sophisticated virological and immunological work, and that was not the interest of CDC and Zaire itself,” Colebunders says.

Although the involved Zairians—who now call themselves Congolese—view the project as hugely successful, they have their own complaints. One critical weakness, says Kakanda Kanjinga—a clinician who, like many of her colleagues, went straight from medical school to a Projet SIDA study—is that the program made little explicit effort to teach locals about research. “When I was at Projet SIDA, I didn’t even know I was doing research,” says Kanjinga, who subsequently earned a master’s of public health at the University of California, Berkeley. “I really didn’t understand the purpose of what we were doing.”

CDC’s William Heyward, who took over from Ryder in 1990, says the project was on its way to filling that gap, noting that it helped send a dozen Zairians to the United States for advanced degrees. He and his colleagues had hoped these “team leaders” would then do “trickle down” training. “I feel quite proud about how much we did do,” says Heyward.

Kapita has a different complaint: Projet SIDA paid too much attention to epidemiology and not enough to treatment and prevention. “I’m sorry to tell you that Projet SIDA had very little impact for infected people here,” he says. “It would have been useful for them to ask us about what was the useful thing for us they could do here.” Kapita is particularly disappointed that the Americans and Belgians didn’t budget money to screen the blood banks for HIV. “We knew that AIDS was transmitted by blood transfusion, but nothing was done about it,” he charges. Money to clean the country’s blood eventually came from the German government’s international aid program, Gesellschaft für Technische Zusammenarbeit.

Projet SIDA’s limited emphasis on treatment even caught the attention of Mobutu (who died of prostate cancer in September). In the summer of 1988, Jack Whitescarver, former deputy director of NIAID, said he was summoned to the Madison Hotel in Washington, D.C., to meet Mobutu. When he entered the Zairian president’s hotel suite, Whitescarver says, “a long line of enormous guys with guns closed in on us” and shunted them over to Mobutu, who wanted to know about treatments. Whitescarver explained that Projet SIDA was addressing the problem. “I’ve never been so terrified,” he says. “I wasn’t sure I was going to get out with my life.”

Piot says those involved with Projet SIDA were acutely aware of the tensions between research needs and public health needs. “That’s a big discussion we always had: What is the responsibility of what is primarily a research project working with research funds in terms of doing something for the country?” The cost of screening the blood supply, notes Emory’s Curran, turned out to be roughly equal to the entire Projet SIDA budget. Project officials also point out that the clinic for prostitutes, opened in 1988 in the Kinshasa neighborhood of Matonge, helped many by providing drugs for their STDs and condoms and education to prevent them. “Before there was the Matonge clinic, I would get infections all the time and miss work,” confirms “Alpha,” a prostitute who works dance clubs in one of Kinshasa’s many downscale neighborhoods. Support from Médecins Sans Frontières (MSF) has kept the clinic alive to this day, and it now serves the public at large.

Salaries for local researchers created another thorny issue—one that often bedevils international research projects. Skyrocketing inflation in 1990 and 1991 drove down the standard $1000 per month salary—which, according to U.S. State Department rules, had to be paid in local currency—to less than $200. “I couldn’t live on that,” says Kavuka Luwy Musey, a former Projet SIDA physician who is now at the University of Washington, Seattle. Kanjinga’s husband, Yadiul Mukadi, a clinician who was studying tuberculosis treatment with Projet SIDA, says the inflation problems had a dramatic impact on the program. “We had a very bad period where our attention was shifted from talking science to talking salary,” says Mukadi, who now works on TB at the California State Department of Health in Berkeley.

Heyward and his top CDC colleague in Kinshasa, Michael St. Louis, fought hard to solve the currency problem. “That was one of the most terrible things during the time I was there, to watch our colleagues suffer,” says St. Louis. “We knew they were having shrinking buying power and income, but we had these absurd rules. The amazing thing to me was that it didn’t have more impact on their work.” Heyward adds, “The State Department was just totally unsympathetic to the problem, and we were just totally frustrated.”

A bad fall

The inflation problem was also tearing apart the rest of the country. In September 1991, Zairian soldiers, angry that they hadn’t been paid, decided to turn Kinshasa upside down, leading to widespread looting and mayhem. St.

Louis well remembers the night that soldiers started firing their machine guns outside the American compound where he lived with his wife and two infants. “We didn’t know what the intent was,” he says. “There was one very scary time when people massed outside our gate and were banging on the door.”

At the Projet SIDA laboratory housed at the INRB, Delfi Messinger, an American zoologist, made a decision that many credit with saving masses of data and samples that had been accumulated. Frightened by the machine-gun fire and people running in the streets, Messinger decided to kill a sheep, put its blood in a 50-cc syringe, and squirt “SIDA” in dripping, meter-high letters on the wall outside the institute. (She repeated this with paint during later periods of unrest.) She also put snakes in cages in front of the entrances to all of the institute’s buildings and, to “booby-trap” her car, put a snake in it, too. “It was scary,” says Messinger, who works on the conservation of a rare chimplike ape called a bonobo. “It was worse than a nightmare.”

A few days later, with the city under the guard of Belgian paratroopers and the French Foreign Legion, Heyward, St. Louis, and the other Projet SIDA expatriates were evacuated across the Congo River to Kinshasa’s sister city of Brazzaville, and they returned to the United States. Eight months later, the CDC and NIH leaders, convinced that the country was still in a quagmire, pulled the plug on Projet SIDA.

To this day, several Congolese researchers cannot understand why the project had to end so abruptly. “I wish they could have tried more to keep that project alive,” says Kamenga. “There should have been more trust in those who were remaining there, the locals. They just assumed because the Americans and Belgians were leaving, they couldn’t continue.”

In 1992, Skip Francis, who had left the project 4 years earlier, found himself back in Kinshasa shutting it down. In part because he was a black American, Francis was asked to return and retrieve equipment, half the stored sera, and data. “It was extremely controversial,” says Francis. “You now had a completely Zairian operation, and now [the Americans] are going to send someone back to take half their stuff.”

Francis encountered trouble even before he reached Kinshasa. He took the Brazzaville ferry into Kinshasa, and, at the border, a soldier hit him with a garden hose. He says he “almost got shot,” too. “I had the misfortune to

be wearing the pants that military people wear with all the pockets," says Francis. "A soldier said to me, 'The pants or you die.'" The soldier settled for $10 instead.

The Projet SIDA team was none too happy to see him. "Basically, they hadn't had a lot of communication [from the Americans]," says Francis. "They were extremely upset. I remember very vividly that first meeting: You had 10 Zairians yelling at me in two languages. It was an agonizing process." During the next few days, the Zairians told Francis which pieces of equipment they wanted to keep and which ones they didn't think they could use. They also shared data and sera that ended up being used in further studies done in the United States.

Musey, who was the lab leader then, wishes they had adopted "a more responsible attitude" with Francis. "Skip was a very nice person and said, 'This is what I'm asked to take. What do you think?'" remembers Musey. "The key was how can we get something if we give them the samples? That's where we failed one more time. We needed to give the samples and get something in return, like funding for 5 years so we can continue to do research even at low levels of, say, $50,000 a year."

Francis, for his part, wishes the United States had a more visionary approach to conducting research in countries like Zaire, where there's great sensitivity about foreign scientists doing "safari research"—swooping in, bagging the data, and leaving. "The way we're committed to do research, we're always going to be at risk for safari research because we work in blocks of 5 years," says Francis, noting that the U.K.'s Medical Research Council has funded foreign projects for 25 years.

Mukadi thinks the CDC in particular made a "big mistake" by not continuing to fund the project. "They could at least have kept some life there," he says, noting that the Belgians and MSF have continued to send some support. "People were coming to work every day even if they didn't have salary. They kept coming. … There are some people I know who are very angry."

Heyward says, "It's a shame that it happened this way," but stresses that the agency could not figure out a way to keep sending in money, which had to go through the U.S. Embassy. "If you have to point the finger at anyone for the way Projet SIDA ended, it was President Mobutu," says Heyward. "It wasn't CDC or the U.S. government's fault. We would love to have Projet SIDA today."

Restarting research

A painful part of Projet SIDA's denouement is that almost everyone involved at the end was delighted with the direction the program was taking. Zaire was one of four developing countries that, with the World Health Organization's imprimatur, was readying itself for trials of AIDS vaccines—trials that would have relied heavily on Projet SIDA. The Zairian researchers were maturing as well, with many of the bright lights ready to return from their training in the United States. As Francis says, "Over time, we would have done more things for the Zairians, and over time, it would have been more and more of a Zairian project."

McCormick, who left the CDC in 1995 and now heads the new epidemiology program at France's Pasteur Institute, still holds out hope for the project. "I wonder if Projet SIDA could be revived," he says. "If Nzila's still there, there are many things to be done that are important. That's a reasonable question to ask."

Nzila is still there. Last month, he showed a visitor to the Matonge clinic a computer print-out that lists 26 prostitutes, followed by the project since 1988, who have never become infected with HIV. Nzila well recognizes that only a few other similar cohorts of "exposed, uninfected" people have been identified, and researchers have studied them intensively looking for clues that might help determine how the immune system can thwart infection—information that might be the key to an AIDS vaccine. He says they still have stored sera from these women that could be analyzed. "We can't do research," shrugs Nzila. "You have to have a lot of money to expand."

Still, Nzila and several Congolese researchers now in the United States hope they'll soon be able to find funds for a collaborative project. And Nzila wants AIDS vaccine researchers to consider once again staging efficacy trials in his country. "If they think they're ready, we'll get ready," says Nzila. "It's important for us to be involved so we will not be outside of the loop."

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Risk of transfusion-associated HIV transmission in Kinshasa, Zaire

llunga N'tita, Kisi Mulanga, Christian Dulatt, Daniel Lusamba, Thomas Rehle, Rolf Korte and Helmut Jager, AIDS 1991, 5:437-439

Summary

Between 5 March and 12 April 1990, we assessed transfusion practices and the risk of transfusion-associated HIV transmission in all the hospitals and medical centers in Kinshasa, Zaire. Of the 733 hospitals and medical centers surveyed, 62 (8.5%) transfuse blood. Of 3741 units of blood transfused in February 1990, 1045 (27.9%) were not screened for HIV infection. Eighteen out of 62 centers (29%) received HIV test kits on a regular basis. Twenty of the centers (32.3%) recorded HIV test results. Major blood group cross-matching was done by 9.7% (six out of 62) of the centers. Bacteriological results indicated contamination in 17% (four out of 23) of stocked blood units, 6.4% (four out of 62) of solutions for disinfections, and 22% (13 out of 59) of sterilized instruments (possessed by 59 centers only). Transfusion practices in Kinshasa are associated with considerable health risks. The establishment and appropriate supervision of HIV screening facilities should be integrated into primary health-care programs in order to increase safe transfusions in Kinshasa.

Introduction

Blood transfusions are an important factor in the trans mission of HIV and other infectious agents in Africa [l]. The demand for blood transfusions is

high in sub-Saharan countries because of the high prevalence of both chronic and acute anemia due mainly to high prevalence of drug resistant Plasmodium falciparum infection, pregnancy-related complications and sickle-cell anemia [2,3].

Efforts have been undertaken to reduce the transfusion-associated risks by developing guidelines for the indications and technical procedures for blood transfusion [3-5]. Recently, special attention has been given to the use of rapid HIV screening assays designed for Third World countries where the lack of equipment, sufficiently trained staff and financial resources have combined to limit the extent to which donated blood is screened in Africa [6]. In this study we assessed the current transfusion practices in a large central African city in order to strengthen ef¬forts to decrease the risk of transfusion-associated transmission of HIV and other infectious agents.

Materials and methods

No complete listing of medical centers in Kinshasa is currently available. Approximately 3.5 million inhabitants may live in this large central African city.

Study personnel (six medical students) identified all medical institutions in the 24 administrative zones of the city between 5 and 24 March 1990. A medical institution was defined as a hospital or a small center offering medical services but not practicing traditional medicine. The students visited all medical institutions zone by zone and asked if blood transfusions were carried out. One physician and two technicians evaluated the blood transfusion practices at each center that was executing transfusions using a standard questionnaire. Information was collected concerning registration of the blood transfusion process, type of tests carried out for blood donors and blood receivers, education of clinical and laboratory personnel, conditions of laboratory equipment used and stock-keeping of essential laboratory materials.

Samples for bacteriological culture were taken from a randomly chosen blood unit (if stocked blood was available), instruments sterilized by the center, and disinfectant solutions found in the medical institution using a commercially available agar preparation (Columbia®, Diagnostics Pasteur, Paris, France). Culturing and bacteriological identification was carried out in the Institute National de Recherche Biomedicale, Kinshasa, Zaire.

Results

Sixty-two (8.5%) of 733 medical institutions identified were practicing blood transfusions when visited in March-April 1990. A total of 3741 units of blood were transfused by the 62 medical institutions in February 1990 (Table 1). Records of blood transfusions were maintained in 26 out of 62 centers (41.9%). In 20 out of 62 centers (32.3%) these records included HIV serology results. Twenty-six of the centers did not screen for HIV but indicated having transfused a total of 1045 units of blood (27.9% of all blood units transfused) in February 1990. Eighteen centers (29.0%) used HIV-1 screening kits on a regular basis. All of these centers used rapid screening assays for emergency transfusions. Six out of 62 centers (9.7%) confirmed rapid test results by enzyme linked immunosorbent assay (ELISA) techniques. Of the 62 centers, most have regular shortages of essential materials for blood transfusions such as HIV test kits (71%), transfusions sets (77.4%), blood bags (75.8%), gloves (59.7%) and antisera (53.2%). Thirty-one (50%) of all centers visited used a refrigerator. Major blood group cross-matching [7] was done by six centers (9.7%). All the other centers carried out cross-matching by mixing up two drops of blood from each blood donor and blood receiver. Twenty-three centers stocked blood units when visited by study personnel. Randomly chosen blood units (one from each of these centers) were contaminated in 17.4%. Disinfectant solutions were contaminated in four (6.4%) of all centers visited. Three centers (4.8%) did not pos sess sterilized instruments when visited by study personnel. In 13 of the remaining 59 centers (22%) sterilized instruments were found to be contaminated. The following bacteria were identified from blood (B), disinfectant solutions (S) and sterilized instruments (I): Enterobacter cloacae (B), Bacillus group (B,S,I), Streptococcus group D (B,I), Klebsiella oxytoca (S), Acinetobacter anitratum (I), Neisseria saprcpbyticus (I).

Only 38 centers (62.3%) disposed of their used materials properly, by burning or burying.

Diskussion

The transfusion practices in most of Kinshasa’s medical centers continue to carry a considerable risk of HIV transmission. Twenty-six centers (41.9%) screened for HIV-1 in February 1990, but only 18 (29.0%) were provided with test kits on a regular basis. Information on the total number of transfusions in February 1990 may be biased as 36 centers (58%) did not

possess any written information concerning the blood transfusion process. Centers not screening for HFV infection indicated having transfused 1045 blood units (27.9% of the total of 3 741 blood units transfused in Kinshasa in February 1990). The HIV sero-prevalence in one of Kinshasa's blood banks has been reported to be 4.8% [1,3] but may vary between different blood transfusion centers because of donor selection.

The general hygiene in blood transfusion centers is often poor, and essential tests like major cross-matching are not always done on a regular basis.

Strict application of guidelines, already established to avoid unnecessary transfusions, should be encouraged, and guidelines for counselling HIV-seropositive donors should be developed. Medical centers should be supervised by a city-wide primary health-care service. Regular provision of rapid screening assays might reduce the risk of transfusion-associated HIV transmission considerably if proper supervision of the centers using them could be guaranteed [8].

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Prevention of transfusion-associated HIV transmission in Kinshasa, Zaire: HIV screening is not enough

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Summary

The purpose of this study was to develop a strategy to reduce transfusion-related HIV transmission which went beyond the limits of routine HIV screening of blood donors. Current blood transfusion practices were assessed in 1044 patients for whom staff physicians had requested a transfusion between 5 September and 19 October, 1988. Children under 5 years of age with malaria, and pregnant women with acute anaemia requiring blood transfusion were the two highest risk groups. Many of the transfusions were given without an obvious medical indication; 22.7% (214 out of 955) of the recipients were transfused without prior laboratory tests [haemoglobin (Hb) or haematocrit (Hct)], 7.2% with Hb >6g/100ml or Hct >25% and 16.6% without clinical signs of severe anaemia (pulse <100/min without shortness of breath). The data of this study were used to organize a workshop for all the physicians responsible for blood transfusions in Kinshasa and two nearby health zones. A consensus statement on the indications for blood transfusion was developed. Subsequently, transfusion centers adopted this consensus statement instead of previous guidelines.

Introduction

Despite the great benefit of, and urgent need for, blood transfusion, this practice remains hazardous in Kinshasa. Blood transfusion is a vehicle for transmission not only of HIV [1-3] but also of hepatitis B, syphilis and malaria [4].

A strong positive association between blood transfusion and HIV sero-

positivity has been demonstrated in children [6,7], who are the most commonly transfused group in Africa [5]. Among pediatric patients with sickle-cell anemia, frequently requiring repeated transfusions, a 20% HIV seroprevalence has been reported [5,8-11]. After 1985, the demand for blood transfusions in the pediatric age group increased dramatically because of the appearance of chloroquine-resistant falciparum malaria in Kinshasa [6]. Pregnant women are the second highest risk group because of high rates of both acute and chronic anemia [5,12,13].

The most important problems in Zairian blood transfusion practice are the use of paid and family blood donors, lack of adequate numbers of voluntary donors, and the lack of materials and trained staff. Most transfusions are administered in emergencies. Since stored blood is not usually available, transfusions are very often given with the blood of any donor available, with blood being transfused to the recipient within hours. This leaves very little time to assure the ‚quality' of the blood through routine screening for blood borne pathogens. These characteristics may account for the relatively high rate of transfusion-related morbidity in Kinshasa.

Two of the three existing blood banks in Kinshasa were renovated and equipped in mid-1988. Routine HIV screening has been guaranteed since then.

While screening for HIV antibodies can greatly reduce the risk of transfusion related transmission of HIV, it cannot detect all infected samples of blood [14,15]. Therefore, other approaches should complement screening activities. Because of the lack of easily defined high-risk groups for HIV sero-positivity, self-deferral of donors at risk and clinical evaluation of blood donors have proved to be of limited use in Kinshasa [2,16]. However, implementation of strict transfusion guidelines appears to be highly effective in preventing HIV transmission in the Mama Yemo Hospital's paediatric population [6,17].

We decided to collect data on current transfusion practices in the Mama Yemo Hospital in order to promote the development of more stringent transfusion guidelines.

Materials and methods

Between 5 September and 19 October 1988, all blood transfusion requests were registered by study personnel in the blood bank of the Mama Yemo Hospital, a 2000 bed facility in Kinshasa, Zaire. Blood transfusion

requests were then processed as usual. The study personnel did not interfere with the application process for blood transfusions.

The recipients for whom the request was made were visited by a study physician who interviewed the patients and completed a standard questionnaire; he also per formed a physical examination. Clinical charts were reviewed to establish the indication for transfusion. Laboratory requests for hemoglobin (Hb), hematocrit (Hct) and thick blood smear for malaria, and whether or not laboratory results were included in the notes were observed. All transfused patients who were still in the hospital 24h after the transfusion were evaluated by a study physician.

All blood donors were screened for HIV infection with a rapid latex agglutination test (Recombigen HIV-1 LA kit. Cambridge BioScience, Worchester, Massachusetts, USA [15]) before transfusion. An enzyme-linked immunosor bent assay (ELISA) test (Wellcozyme, Burroughs Well come, Dartford, UK) was performed on all samples, but because of time constraints the ELISA results were only available after blood was administered.

Results

A total of 1025 donors were registered and screened for HIV infection. Nearly fifty-five per cent (54.6%) of donors were relatives of recipients (family donors), and 22.9% were paid blood donors. Very few voluntary donors from organizations such as the Red Cross were registered (1.1%). Twenty-one per cent (21.4%) of donors were people occasionally giving blood (friends or neighbors of patients). Nine per cent of donors had to be deferred because of positive HIV latex test results [15]; overall donor HIV sero-positivity by ELISA test was 4.8%.

Blood or blood products were required for 1044 patients, with 955 (91.5%) eventually transfused. Figure 1 shows the age distribution of the patients for whom a transfusion was requested. Blood was required most frequently for children under 5 years of age (44.1%) and adults between 15 and 40 years of age (34.8%). For children under 5 years of age the most common indications for blood transfusions were infectious diseases (88%; 405 out of 460), malaria being by far the most important (77%; 354 out of 460) (Table 1).

The weight: age ratio in children transfused under 5 years of age was very low, indicating malnutrition as an associated factor. The average body

weights of children (boys and girls) of 6, 12, 24 and 36 months of age were found to be 6.0kg (s.d. 3-D and 4.6kg (s.d. 3.2), 6.8kg (s.d. 3.5) and 4.8kg (s.d. 4.4), 9.0kg (s.d. 4.0) and 8.2kg (s.d 4.5), and 8.6 kg (s.d. 5.2) and 10.6kg (s.d. 4.0), respectively, which are below the third percentiles for boys and girls in a reference population [18].

Pregnancy-related complications were the most important cause of transfusion in patients between 15 and 40 years of age (43.3% of all patients: 157 out of 363, or 57.5% of female patients: 157 out of 273).

- : Age distribution in transfused patients, Kinshasa, 1988
- Table: Indications for blood transfusion, in percentages, at the Mama Yemo Hospital, Kinshasa, 5 September-19 October, 1989

One-third (33.0%; 345 out of 1044) of patients for whom a transfusion was requested had a history of transfusions and 42.9% (148 out of 345) of these patients had received two to 15 previous transfusions.

A total of 214 (22.4%; 214 out of 955) patients were transfused without prior tests (Hb or Hct). Seventy-one percent of all transfusions without laboratory tests occurred in patients > 15 years of age. An Hct was performed in all 753 patients for whom laboratory results were obtained: 186 patients (25%) had Hcts of below 15%, 343 patients (46%) had Hcts between 15 and 19.9%, 142 patients (19%) had Hcts between 20 and 24.9%, and 82 patients (11%) had Hcts of 25% and above.

Emergency transfusions, defined as transfusions not requested for elective surgical interventions, occurred in 95.3% (204 out of 214) of patients without laboratory tests. This rate is not significantly higher than the rate of emergency transfusions given when laboratory results were available (93.5%, 693 out of 741). Transfusion-associated complications were evaluated in all patients who could be examined 24 h after the transfusion (650 out of 955; 68%). The overall incidence of complications in this group was 11.7% (76 out of 650). Eighteen of 650 (2.7%) patients experienced major transfusion-related complications (cardiogenic or anaphylactic shock), followed by death in 12 cases (1.8%; 12 out of 650). Severe hemolytic reactions were not observed; minor complications included fever, tachycardia, and dyspnea. In cases where information was available 24 h after transfusion, 5.1% (33 out of 650) of patients examined died within 24 h. Among children under 5 years of age the incidence of complications was

even higher 15.5% (33 out of 213).Post-transfusion status could not be assessed in 31.9% (305 out of 955) of the recipients as they had left the hospital within 24 h of the transfusion. Sixty-two per cent (190 out of 305) of those recipients who left the hospital almost immediately after the transfusion were children under 5 years of age. Eighty per cent of them presented with Hb < 5g/100ml or Hct <20%, when laboratory results were available (191 out of 238). On average, their Hct was lower than that of patients who stayed in hospital (16.6 ± 4.0 compared with 18.5 ± 6.5). However, the difference was not significant.

The following principles were adopted unanimously by the workshop, which was composed of the heads of departments and physicians of all hospitals, institutions and organizations that transfuse in Kinshasa and two nearby health zones:

- A laboratory test (Hb and Hct) to prove severe anaemia would be indispensable before any blood transfusion. The critical threshold value under which a transfusion should be considered was defined as 6.0g/100ml Hb or 20% Hct. For patients with sickle cell anemia 5.0 g/100ml, and for surgical patients 10g/100ml Hb, were accepted, the exception being emergency transfusions for acute massive blood loss, when Hct may not reflect true blood volumes.
- For pediatric patients (children under 12 years of age) a transfusion is not indicated if a patient presents without clinical signs of severe anemia, defined as: pulse > 120/min, presence of dyspnea and disturbed consciousness.
- In adults, transfusion is not indicated if a patient presents without clinical signs of severe anemia, defined as: pulse > 100/min; presence of dyspnea; disturbed consciousness; systolic blood pressure <100mmHg.
- A National Blood Transfusion Committee should be formed under the guidance of the Ministry of Health. Each department and institution should develop its transfusion policy, which should be used by the National Blood Transfusion Committee to develop national blood transfusion guidelines.

When these criteria were applied in retrospect to our population, 12.9% of the transfusions in the pediatric age group and 20.6% of the transfusions in the adult age group did not meet the criteria.

Discussion

Blood transfusions are undertaken for different reasons in Kinshasa than in developed countries, because of a high background prevalence of anemia and the high incidence of symptomatic life-threatening malaria in the pediatric age group. Acute blood loss accounts for an important number of transfusions among pregnant women only.

The fact that most transfusions are carried out in emergencies, in a blood transfusion center which may lack sufficiently trained staff, and that the blood for transfusion has been shown to have a high background prevalence of HIV infection, malaria, hepatitis B and syphilis [4], explains why blood transfusion is still hazardous in Kinshasa. Compared with European blood bank statistics, where the incidence of all transfusion reactions is estimated to be 2%, and that of severe hemolytic reactions to be two out of 210 000 [19-22], we found the incidence of complications after blood transfusion to be much as 15.5% in Kinshasa, a very high percentage. Considering the high incidence of transfusion-related complications, and that blood transfusion will remain an important factor for the transmission of HIV and other infections in Africa, it is essential to limit transfusions to life-saving situations [2,23].

Our data suggest that more effective control of malaria, improved child health and antenatal/obstetric care could reduce the demand for blood transfusions dramatically. The workshop to discuss the findings of this study resulted in the elaboration and acceptance of guidelines in Kinshasa and two nearby health zones as a preliminary step to improving transfusion practice. Validation of these criteria depends on continued evaluation and will be one of the functions of the recommended National Blood Transfusion Committee which was recently established.

Assuring that blood supplies can be safely used in Africa will involve more than HIV testing alone. It requires a multifaceted approach, including efforts to avoid unnecessary transfusions.

Acknowledgement

Dr. Bosenge N’Galy died in a tragic accident in July, 1989. His presence is strongly missed by his colleagues.

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Safe blood transfusions in Africa

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Introduction

The occurrence of AIDS among patients previously treated with blood transfusions led to a number of changes in the blood transfusion services (BTS) in developed countries. Since AIDS in these parts of the world is associated with high-risk sexual behaviour and intravenous drug use, exclusion of potential blood donors based on these risk factors was instituted in 1982-1983. Efficient screening techniques for HIV antibodies were implemented in 1985-1986. In addition, improved techniques for preparation of blood components, which can maintain their biological activity during storage for several days (platelets), weeks (red blood cells), or even months (fresh frozen plasma), have been developed over the

last 10 years. Effective transfusion therapy with these blood components has been established, using only blood units which test negative in the screening assays for syphilis, hepatitis B, HIV and, more recently, hepatitis C. Quality assurance programs have been an integral part of the blood programs in developed countries, covering essential aspects ranging from recruitment of blood donors and production and control of blood units to safe administration routines and their reporting.

These approaches have resulted in very low risk of transfusion-associated HIV transmission in developed countries [1-5]. There is still a remote risk of HIV infection in people who receive blood screened as negative for HIV-antibody [6-12]. Nevertheless, an annual decrease in risk rates by more than 30% between 1985 and 1987 has been reported [13-14]. Using data from over 17 million American Red Cross donations, Cummings et al. [14] estimate that the probability of con¬tracting HIV infection in 1987 was 1/153000 per unit transfused.

In contrast to the situation in the developed countries, blood transfusion in sub Saharan Africa carries a high and even increasing risk to the recipient of acquiring HIV and other blood-transmitted infections, such as hepatitis B, hepatitis C, syphilis and malaria [15-17]. The risk of transmitting HIV and other infectious diseases varies considerably depending on prevalence rates of the blood donor population [16,18,19]. Seroprevalence rates for anti-HIV-1, hepatitis B surface antigen (HbsAg) and syphilis (Treponema pallidum hemagglutination; TPHA) in a large central African blood bank were reported to be 4.8, 13.1 and 13.3%, respectively [15], compared with 0.004, 0.03 and 0.06% among volunteer donors in American blood banks [20].

In Africa, blood transfusion has become the third most important mode of HIV transmission, after heterosexual and perinatal transmissions [21]. Experience from developed countries indicates that nearly all recipients of HIV-infected blood become seropositive and that almost half will develop AIDS within 7 years [22]. Host factors, such as age, primary disease and general health status, may influence the length of incubation period [23,24]. Rapid development of AIDS in the blood donor appears also to be transmitted to the recipient, indicating inherent differences within HIV-1 viruses [22].

National blood transfusion programs

Unfortunately, strategies which have proved highly effective in securing a safe blood supply in developed countries are difficult to implement in many central African countries. It is important to realize that the supply of safe blood transfusion as part of a national health-care system is costly and requires the development of a national blood program. It is the responsibility of the national blood programs to develop strategies which address the following key areas: donor recruitment and control of blood units, regional cooperation, training of personnel, development of guidelines to: use of blood and blood products and their implementation, cooperation with development programs and financial aspects of operations. Such programs have already been shown to be highly effective in some countries [25].

The World Health Organization (WHO) Global Blood Safety Initiative (GBSI) was formed to address these important needs and to assist member countries in the developing world to improve BTS with the goal of developing ‚integrated blood transfusion systems' appropriate to the countries' health-care systems. This assistance is dedicated to ensuring the sustainability of the program, and combines availability of expertise and financial donor funding for the program in its development phase.

Recruitment of blood donors and screening for infectious agents

The present situation in most countries in Africa shows that HIV infection and AIDS occur with equal and high frequency in men and women, making selection of low-risk donors more difficult. Recruitment of voluntary, non-remunerated blood donors is costly and dif ficult and only in its infancy. The steady production of blood units (which are released from quarantine only if results of mandatory testing are negative), is uncommon because of the lack of blood donors. Stocked blood is therefore in short supply and blood is usually drawn and transfused immediately. Most of the donors used belong to groups usually avoided by BTS in developed countries. They are family and paid donors who belong to low socioeconomic classes with a poor general health status. Many medical institutions not only suffer from the above mentioned constraints, but in addition often lack a reliable system for recruitment of voluntary blood donors [15].

The need for recruitment and retention of safe, voluntary blood donors cannot be overemphasized. However, modem blood banking is neither technically nor economically feasible in most African countries. They frequently lack facilities for blood banking, equipment, regular supplies,

sufficiently trained staff and financial resources and must therefore depend largely on fragmentary support from international organizations. All these factors contribute to unsafe operation and limited HIV screening of donated blood [16,26].

Screening of blood and blood products to ensure the prevention of transmission of HIV in the developing world has been a major priority for the WHO Global Program on AIDS (GPA).

However, HIV testing alone cannot be successful without addressing other important aspects of blood transfusion in order to provide safe blood and blood prod ucts. WHO/GPA recognizes the urgent need for rapid intervention strategies and has developed specific objectives.

The cornerstone of a safe blood supply is a safe donor population. Strategies to assist developing countries to carry out the difficult task are being developed by convening informal meetings of experts from developed and developing countries. Recommendations will be made by carrying out a feasibility study in three regions, Africa, Asia and the Americas, for implementing specific blood donor communications techniques, including field testing of the techniques. Utilization of the recommendations will assist in the evaluation of the targets achieved by country programs in order that changes may be made as necessary for the strategies devised.

Testing of all blood donations for HIV (and other infectious agents) using simple or rapid tests or enzyme-linked immunosorbent assays (ELISA) will be encouraged. Simple/rapid tests in particular will be recommended where there is no established blood bank system and blood may be needed for emergency use.

Training programs

Training of existing staff at centers where blood transfusions are carried out, especially training of trainers in short courses, is seen as an important activity. Training of trainers in the Africa region is already well advanced and two courses for blood transfusion medicine specialists were held in 1990. One course trained senior medical laboratory technologists from 20 countries in a 3-week course. The participants in the second course were medical directors, administrators, blood donor recruitrrient officers and nurse phlebotomists from five different African

countries. Distance Learning Course (DLC) material will be developed in 1991 to augment these 3-week courses so that the trainers participating in the course will use the material. They will return to their home countries to continue training with DLC material and minimal external assistance. The initial DLC material will address BTS medical laboratory tech nologists in the important areas related to ensuring a safe blood supply and will be an ongoing development process.

Education of the prescribers of blood transfusion is an important objective to ensure appropriate use of blood to reduce unnecessary blood transfusions and to encourage the use of plasma volume substitutes where necessary.

Practice of blood transfusion

Despite the high prevalence of HIV infection among blood donors in Africa, treatment of severe anemia with blood transfusion remains a major cause for pediatric hospitalization [27]. In children, who receive most of the transfusions, the demand increased dramatically in Kinshasa because of the appearance of chloroquine-resistant falciparum malaria [28].

Pregnant women in tropical Africa are often anemic: the common causes are malaria, iron and folate deficiency and sickle-cell anemia. Malnutrition, hookworm anemia and existing socioeconomic conditions are common causes for the poor health status associated with severe chronic anemia in the general population [29j. In cases of acute drug resistant malaria or parturition-related hemorrhage, patients are often brought to medical facilities in serious conditions.

The clinical outcome of blood transfusions in African countries is often doubtful when treating acute complications in chronic anemia, which is the most frequent indication for transfusion in children. The frequency of severe complications in one recent study was as high as 15.5% of all blood transfusions administered to children under the age of 5 years [30]. In Nairobi, Lackritz et al. [27] found that survival of children with severe anemia (hemoglobin < 5.0 g/dl) was not improved if treatment included blood transfusions. The poor clinical outcome may be caused in part by the poor quality of produced blood units and of laboratory work. In some medical institutions in Africa, treatment with blood transfusion is not even registered and general hygiene is low [31]. Other factors might be the already poor health status of the children transfused resulting in frequent acute heart failure due to volume overload when transfusing whole blood.

In summarizing the overall serious and difficult situation, it must be stressed that the present prevalence rates of anti-HIV among available blood donors call for extreme care in adhering to strict indications for treatment with blood transfusions, since the associated risks may easily outweigh the benefits of transfusion for most patients several fold.

The major strategies [32-39] to be considered in the control of transfusion-associated AIDS and other infections in developing countries and in Africa in particular include the following:

- reduction in the number of blood transfusions;
- primary health care programs designed to improve general health status, guaranteeing vaccination, supervising mother and child health-care services and focusing on preventive health care and eradication of malaria;
- encouraging voluntary blood donors and exclusion of high risk blood donors, such as paid donors;
- improvement of blood transfusion services including screening of all donations for HTV antibodies.

Autologous transfusions

In developed countries autologous blood transfusion for selected patients is a medically sound procedure and may eliminate the risk of disease transmission [20,22,40].

Preoperative deposit, perioperative hemodilution and intraoperative blood salvage have all been covered in recent publications from WHO/GBSI [41]. Autologous blood salvage is most useful in elective or planned surgical procedures.

Preoperative autologous blood donation (PABD) requires accurate record keeping, labelling, and adequate facilities for collection and storage. A well-organized blood transfusion service is essential. Costs of PABD are much higher than homologous blood transfusion. PADB blood may be the only blood available in the hospital blood bank. This will cause an ethical dilemma where blood transfusion is considered life-saving in emergency situations which involve an unrelated patient, . HIV infection involving PABD may increase risks to staff and should not be stored in the same refrigerator as normal, voluntary blood donations. The use of acute

isovolemic haemodilution (preoperative), intraoperative salvage and postoperative salvage provides a practical approach to an autologous blood program in almost all settings.

Counselling any patient for a proposed predeposit autologous blood program must be considered ethically, confidentially and sympathetically, particularly in those cases where patients are confirmed HIV-positive.

The frequent occurrence of severe anemia requiring iron and folk acid supplementation makes implementation of pre-deposit autologous blood programs difficult. However, this procedure should be encouraged for planned operations. Intraoperative blood salvage using simple, inexpensive equipment may be life-saving. Preoperative hemodilution, using colloids and crystalloids, is used increasingly in developed countries and should also be suitable in developing countries.

Blood transfusion committees

In most African countries, blood transfusion is indicated only when the life of the patient is at serious risk [29]. Situations where blood transfusion may be necessary include severe anemia leading to incipient cardiac failure, profound hypovolernic stock when the blood pressure and oxygenation cannot be maintained; severe neonatal jaundice.

Despite the increase in demand for blood transfusion in Kinshasa, the implementation of strict transfusion guide lines proved to be both practical and effective [30,42,43]. During a consensus meeting in Kinshasa a critical threshold value under which a transfusion should be considered was defined as 6.0g/100rnl hemoglobin or 20% hematocrit.

A transfusion was considered not to be indicated when the patients presented without clinical signs of severe anemia, defined for pediatric patients as pulse > 120/min, presence of dyspnoea and disturbed consciousness, and for adults as pulse > 100/min, presence of dyspnoea, disturbed consciousness and systolic blood pressure < 100mmHg [30].

Application of rigorous guidelines for the indication of blood transfusion reduced the number of blood transfusions in the pediatric ward of a large Central African hospital from 16352 in 1986 to 3981 in 1989, without any observed increase in mortality [42,43].

Each blood transfusion service should reexamine transfusion practices. A reappraisal of the necessity for blood transfusions is essential. Blood transfusion committees should be created and the blood transfusion practice reviewed at a regular basis. Efforts should be undertaken to increase the knowledge of practicing physicians about transfusion medicine and recipi ents should be adequately informed about the risks of blood transfusion. All possible steps should be taken to avoid unnecessary blood transfusion and to en courage alternative treatment modalities using saline, plasma expanders and albumin solutions for acute hy-povolaemia [44].

Reducing the need for blood transfusion

Coinfection with more than one organism is common in poor countries; most infants and children dying in Africa have some combination of malnutrition, malaria, multiple intestinal helminths, diarrhoea and respiratory disease [45]. AIDS control programs and programs designed to limit the inherent risk of blood transfusion should therefore be integrated with primary health care, both in the education of the public and in measures to prevent general causes of chronic anaemia in children and pregnant women, thereby reducing the need for blood transfusion.

Acute obstetrical haemorrhage can often be prevented by giving special attention to women at risk during pregnancy. Services at primary health-care clinics, antenatal clinics, ‚under-fives' clinics, sickle cell clinics and vaccination programs should be improved. All programs directed at improving general living con ditions, nutritional status and socioeconomic status might have a considerable impact on the need for blood transfusion.

Special attention should be given to malaria as one of the major reasons for blood transfusion in child hood. The importance of malaria is increasing because of the rise of drug-resistant forms of Plasmodium fal-ciparum infection [28]. Malaria-control programs should therefore be strengthened and considered to have an important impact on the HIV transmission by decreasing the demand for blood transfusion.

Quality assurance in blood banking

WHO has elaborated a strategy for developing countries which is designed to improve laboratory conditions and thus reduce transmission of HIV and other infections by blood transfusion [33-38]. The implementation of this strategy meets various constraints, the most important of which are

financial and economic problems.

Blood banks and decentralized screening programs are feasible when supported by international donor organizations [46]. At the BTS at Nakasero (Kampala, Uganda) the cost of each unit of HIV-negative hepatitis B surface antigen-negative blood was 21.5 ECU (US$25) in 1989 [47].

International development programs should concentrate on the sustainability of an intervention. Continuous evaluation should be carried out and proven systems of quality control should be integrated in all programs. In Rwanda, the encouragement of voluntary blood donor recruitment resulted in the decrease of HIV-sero-positivity in donors from 13 to 2% from 1985 to 1989, respectively [25]. Payment for blood do nation might attract donors with higher rates of viral hepatitis and HIV infection [48,49]. A greater proportion of voluntary donors means more supplies of stored blood. This allows time for more extensive screening of the blood to detect infections. Since the treponemal spirochete cannot survive longer than 72 h at 4°C, the benefit of using stored blood for transfusions is obvious [50]. However, those found positive for treponemal infection should be considered a risk group because of implicit behaviour patterns [51].

Blood donor recruitment is also a useful vehicle for disseminating information on HIV infection [15]. Rapid, easy and economical screening tests for antibodies to HIV have recently been developed [26,52-55]. These screening tests are designed for countries where laboratory standards and quality of trained staff are low and which therefore demand tests which are easy to carry out and interpret. They have proved to be very sensitive and highly specific [26] and can be used at a health district level, when proper quality control is assured [46,56]. Yet even these tests require proper supervision and should be carried out by well-trained primary health-care personnel in order to guarantee the strict confidentiality of test results. All transfused blood should be screened for HIV whenever possible.

Potential blood donors might thus serve as a useful population for surveillance even if, due to selection of donors, the HIV infection rate among donors does not reflect that of the general population [17,57,58]. Clinical examination and self-deferral of high-risk donors has proved to be of limited value in Africa in one study [59].

Counselling of donors

HIV screening should be mandatory for all blood donations. It is important that all blood donors are carefully counselled on the possible outcome of the test result, so-called ‚predonation counselling‘.

Proper guidelines have to be developed on how test results should be interpreted, especially when Westem blot is not feasible or specialized laboratories performing Western blot with adequate proficiency are inaccessible [60]. Combining the results of two HIV screening assays might be an alternative to Western blot [55].

Post-donation counselling may not be performed by the blood transfusion services, which may already have limited resources and be unable to guarantee the requisite quality of blood. Nevertheless HIV positive blood donors are an important health risk to the general public and should be identified and educated to change their personal behaviours [61]. Therefore, special facilities for counselling and clinical examination should be established. Referral systems need to be developed to ensure confidentiality and appropriate follow-up.

Conclusions

Each sub-Saharan country must develop its own national blood transfusion policy. Objective, realistic and comprehensive transfusion guidelines have to be formulated and implemented. The overall aim of these strategies is to minimize the occurrence of blood transfusion-associated AIDS in Africa. Education programs covering various aspects of transfusion medicine should receive support and take sustainability of blood programs into consideration. Focusing on improvement of general health [62] and strengthening the efforts to further develop primary health care would reduce the need for blood transfusion in developing countries.

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AIDS and cofactors of HIV transmission in Africa

Helmut Jaeger, International Journal of Experimental and Clinical Chemotherapy 1992, 3: 185-I86

Abstract

In Africa, HIV is predominantly spread by heterosexual intercourse. Other sexually transmitted diseases (STD) facilitate the dissemination of HIV and core groups are playing an important role in HIV epidemiology. Parenteral transmission of HIV in Africa must still be considered a major problem. The main strategies of AIDS prevention in Africa are reinforcement of STD control programes and health education of the general public, targeting intervention programes on core groups, and improvement of the quality of general medical care including save blood supplies.

Survey

In 1991 the prevalence of HIV-1 in Africa was estimated at 6 million infections. In addition, 800,000 adults and 500,000 children are suffering from AIDS in Africa (MERSON 1991). An unknown, but nevertheless probably considerable number of not infected siblings of HIV seropositive women became or will become orphans during early childhood. The prevalence of HIV-1 infected women between 15 and 49 years of age was estimated at 2,500 per 100.000 (CHIN 1990). In 1990 the HIV-1 prevalence in Central Africa was reported to be higher than 10 % in some urban population groups with low

risk for HIV infection and up to 80% in population groups carrying extremely high risks for HIV infection (AMAT-ROZE et al. 1990; TORREY and WAY 1990). The HIV-1 sero-prevalence in various Central and East African studies was found to be 5,5 %-22,5 % for pregnant women, 35,0 %-80,0% for female prostitutes, 16,4 %-42,5 % for male STD-patients, 16,4 %-62,5 % for female STD-patients, and 32,2 %-35,2 % for long-distance truck drivers (NKOWANE 1991). Parenteral transmission by blood transfusions and injections is considered to be considerably less important than the sexual transmission of HIV. But given the large number of injections administered by health care personnel in and out health care settings under poor conditions of general hygiene (SCHEIBER et al. 1991) and the difficulties to provide safe blood supplies (N'TlTA et al. 1991), parenteral transmission may be contributing significantly to HIV infection in Africa. The predominant mode of HIV transmission in Africa is heterosexual contact. The role of other sexually transmitted diseases (STD) enhancing the spread of HIV infection has been studied in various prospective, controlled research settings in Africa since 1987. In 1989 a significant association between the acquisition of a genital ulcer (the majority being chancroid) and later HIV seroconversion has been demonstrated in male clients of female prostitutes in Nairobi/Kenya (CAMERON et al. 1989). The relative risks of HIV-1 seroconversion (adjusted after multivariate analysis) in the presence of another STD were found to be 3.3-4.7 (genital ulcers) (CAMERON et al. 1989; Plummer et al. 199la), 4.4 (genital herpes) (HOLMBERG et al. 1988), 2.7 and 3.2 (Chlamydia infection) (LAGA et al. 1990; PLUMMER et al. 1991a), and 2.7 (Trichomonas vaginalis) (LAGA et al. 1990). STD may cause disruption of the normal epithelial barrier or microulcerations in the mucosa and increase the pool of lymphozytes and macrophages (targets or carriers of the human immunodeficiency virus). Similarly, the perinatal HIV transmission is enhanced in the presence of chorionamnionitis (RYDER and TEMMERMANN 1991). In Africa the spread of HIV is very heterogeneous in different population groups and most rapid in small subpopulations („core groups"): mobile, urban males, (temporarily) separated from their families, like longdistance truck drivers, soldiers, miners, seasonal workers etc., and female prostitutes. Urbanization, selected male migration to major cities in search for work, disruption of rural agrarian life and traditional values, famine, poverty, and war are leading to a large number of single men (or men having left their spouses in rural areas) and a smaller urban lower stratum of women willing to sell sex for survival. Intervention programs in Africa concerning heterosexual transmission are focusing on STD control and core group populations. If these programs are to succeed, they must be implemented in cooperation with the targeted

population. Victimization by passing laws, rounding up core group members, and punitive interventions are misguided and have been found to be ineffective in Africa (PLUMMER et al. 1991 b).

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Voluntary Blood Donor Recruitment: A Strategy to Reduce Transmission of HIV-1, Hepatitis-B and Syphilis in Kinshasa, Zaire

Jager, K. Nsekab, B. Goussard, C.-M. Kabeya, G. Rauhaus, G. Peyerl J.-J. Salaunc, R. Korte, Infusionstherapie 1990, 17:224-226

Summary

We evaluated the use of voluntary blood donor recruitment in Kinshasa, Zaire, as a means of reducing transmission of HIV-1 and other infectious agents by blood transfusion. Between January 1. 1989, and April 7, 1989, 2,237 blood donors were enrolled in the study at the transfusion centre of the Mama Yemo Hospital. Each donor was tested for antibodies to HIV-1 confirmed by IFA and Western blot, Treponema pallidum, antibodies to hepatitis B virus (HBV) core antigen and screened for the presence of the HBV surface antigen. Test results were related to the data of the blood donors: age. sex. haematocrit, voluntary blood donor, family member donor, paid donor. The serological results of all donors for Anti-HIV-1, Anti-HBc. HBsAg and TPHA were 4.8%, 70.9%, 13.1% and 13.3% respectively. Lower seroprevalence rates were found among voluntary blood donors. However, only TPHA seroprevalence was significantly lower in voluntary blood donors (8.4%, 23/275) compared with paid donors (15.2%, 87/571) ($p<0.01$). A greater proportion of voluntary donors provides a store of blood which allows more extensive screening of blood for HIV-1 and other infectious diseases. Voluntary blood donor recruitment is critical for the provision of safe blood supplies in Kinshasa.

Zusammenfassung

Gegenstand der Untersuchung ist die Bedeutung der Blutspenderwer-bung fur die Verminderung des Übertragungsrisikos von HIV-1 und anderen Krankheitserregern in Kinshasa, Zaire. 2237 Blutspender wurden vom 1. Januar bis 7. April 1990 in der Blutbank des Krankenhauses «Mama Yemo» untersucht. In den Spenderserien wurden Hepatitis B Oberflachenantigene

(HBs) und Antikörper gegen das Kernantigen (Anti-HBc) nachgewiesen sowie Antikörper gegen HIV-1 (bestätigt in Immunofluoreszenz und Western blot) und gegen Treponema pallidum (TPHA). Die Testergebnisse wurden zu folgenden Spenderinformationen in Bezug gesetzt: Hämatokrit. Alter, Geschlecht und Art des Blutspenders (freiwilliger Blutspender, bezahlter Blutspender, Blutspender aus der Familie des Empfängers). Es fanden sich folgende seropositive Testergebnisse: Anti-HIV-1 (4,8%), Anti-HBc (70,9%), HBsAg (13.1%), TPHA (13,3%). Freiwillige Blutspender zeigten geringere Seroprävalenzen, die jedoch nur im TPHA signifikant niedriger (8,4%, 23/275) als bezahlte Spender (15,2%, 87/571) lagen. Blutvorratshaltung ist die Voraussetzung für eine sorgfältige Untersuchung des Blutes auf HIV-1 und andere Krankheitserreger. Sie ist nur durch die Steigerung des Anteils freiwilliger Spender möglich. Blutspenderwerbung ist daher in Kinshasa unabdingbar für eine sichere Transfusionspraxis.

Introduction

The World Health Organization has elaborated a strategy for developing countries which is designed to reduce transmission of HIV and other infections by blood transfusion [1]. Special attention is given to means that avoid unnecessary transfusions: voluntary donor recruitment is encouraged [1-3]. In Kinshasa the implementation of strict transfusion guide lines proved both practical and effective [4, 5). Examination of blood donors and self-deferral were found to be of limited value in selecting high risk donors [6]. Emphasis was, therefore, placed on increased replacement of paid donors by voluntary donors whenever possible.

In September 1988, only 1.1% of all blood donors were voluntary in Kinshasa’s largest blood bank [4], compared with 12.3% during the study period. In Kinshasa most blood transfusions are performed in emergencies. They are rarely requested for selective interventions. Stored blood is in short supply, necessitating the use of rapid test assays for HIV-1screening [7] as blood samples routinely screened by the Elisa test are often not available. In the present study, we aimed to estimate the risk of transmitting HIV-1, hepatitis-B and syphilis by blood transfusion in Kinshasa and to determine whether this risk could be reduced by encouraging voluntary blood donor recruitment.

Material and Methods

In 1987, the GTZ (Deutsche Gesellschaft fur Technische Zusammenarbeit,

Eschborn, FRG) began to rehabilitate two blood banks in Kinshasa. Recruitment of voluntary blood donors began in October, 1988. Blood bank personnel regularly instructed church attendants, factory workers and Red-Cross personnel on the benefits of voluntary blood donors (decreased HIV transmission due to blood transfusion). Between January 1, 1989, and April 7, 1989, 2,237 blood donors were enrolled in the study at the blood transfusion centre of the Mama Yemo Hospital, Kinshasa, Zaire. The donors were divided into three groups:

- Voluntary blood donors, encouraged to give blood by blood bank personnel.
- Family member donors.
- Paid donors. We defined paid donors as persons who congregate outside the hospital and seek out relatives of a patient requiring blood transfusion. They often claim to be relatives of the recipient in order to avoid exclusion by the blood bank.

Age. sex and haematocrit (HCT) results of all donors were registered. Sera from all donors were screened for antibodies against Human Immunodeficiency Virus 1 (dupont de Nemours Hivcheck, Bad Homburg, FRG. and Behring Enzygnost Anti-HIV Micro, Marburg, FRG), Hepatitis B-Virus (Behring Enzygnost Anti HBc. Marburg, FRG), Treponema pallidum (Behring Cellognost Syphilis, Marburg, FRG) and tested for HBs-Antigen (Behring HBsAg Micro, Marburg, FRG). When test results were positive or doubtful in one anti-HIV-1 screening test, the donor was deferred and the serum tested for confirmation by Immunofluorescence assay (H9-V3 vs H9 non infected, J. Bernard, Institut Godinod. Reims, France) and Western blot (LAV-Blot 1 Diagnostics Pasteur. Paris. France) at the Institut National de Recherche Biomedicale/Kinshasa, ZaTre. Sera were considered positive for which one anti-HIV-1 screening test was positive and the result was subsequently confirmed in both IFA and Western blot [8]. Anti-HBc and HBsAg screening tests were repeated if test results were within 10% of the calculated O.D. (optical density) cut-off. Only clearly reactive sera (O.D. greater than 10% calculated cut-off) were declared positive for HBV core antibody or HBV surface antigen. Treponema pallidum haemaglutination assay was considered positive when haemaglutination was observed with subsequent confirmation at a dilution of 1:32 by a second test. With the exception of TPHA, IFA and Western blot, all tests were performed with sera which had not been frozen. The rapid test assay (Dupont de Nemours Hivcheck) [7] was performed by different technicians on a 24h basis. All other tests were carried out

regularly by the same technicians. The uncorrected Chi-Square and Mantel-Haenszel's test were used to assess the strengths of association for categorical variables.

Results

2,237 blood donors were enrolled in the study; 12.3% (n = 275) voluntary donors, 62.2% (n = 1,391) family member donors and 25.5% (n = 571) paid donors. Of all the donors, 9.2% (n = 206) were women and 90.8% (n = 2,031) were men. The average age of the blood donors was 31.8 years (SD: 7.9) for women and 33.3 years (SD: 8.2) for men. The average HCT was 33.7% (SD: 15.9) for women and 40.7% (SD: 10.9) for men. The seroprevalence rates of confirmed anti-HIV-1 antibodies, anti-HBV core antibodies, HBV surface antigen, and anti-treponemal antibodies are shown in Table 1. Seropositivity did not vary by sex but differed by age (Table 2). Lower seroprevalence rates of anti-HIV-1, anti-HBc, HBsAg and anti-treponemal antibodies were found among voluntary blood donors. However, the difference were not significant between donor groups, except for TPHA results, where voluntary donors had significantly lower positivity than paid donors (Table 3). A total of 163 (7.3%) blood samples were not transfused. 128 (5.7%) deferrals of potential donors were caused by at least one reactive anti-HIV-1 screening assay. 35 (1.6%) blood samples were found to be positive for HBsAg but negative foranti-HIV-1 and eliminated. 247 blood samples (11%) HBsAg reactive and negative for anti-HIV-1 had already been transfused before test results became available.

- Table 1. Seroprevalence of anti-HIV 1, anti-HBV core antibody, HBV surface antigen and anti-treponemal antibodies
- Table 2. Seroprevalence of anti-HIV 1, anti-HBV core antibody, HBV surface antigen and anti-treponemal antibodies related to age groups
- Table 3. Positive serology related to different donor groups

Discussion

A program designed to promote voluntary blood donation increased the proportion of lower risk donors from 1.1% to 12.3% in a 6 month period. Efforts should be made to encourage the use of voluntary blood donors rather than paid blood donors for three reasons:

- First, we found that blood donor recruitment is a useful vehicle for

disseminating information on HIV infection.

- Second, a greater proportion of voluntary donors means more supplies of stored blood which allows time for more extensive screening of the blood to detect infections. Since the tre-ponemal spirochete cannot survive longer than 72 hours at 4°C the benefit of using stored blood for transfusions is obvious [9]. Furthermore, syphilis screening may not be cost-efficient in Kinshasa, since a positive test for anti-treponemal antibodies does not necessarily indicate that the blood can transmit syphilis through transfusion [10, 11]. Deferring donors who were positive for TPHA, in addition to those either positive for at least one anti-HIV-1 screening assay or HBsAg would exclude 29.3% (655/2,237) of the potential donors from Mama Yemo Hospital. This compares with 18.2% (407/2,237) of the donors who would be excluded because of their positive screening test results for anti-HIV-1 and/or HBsAg. We found that 87.6% (247/282) of the blood samples found to be positive for HBsAg but negative for anti-HIV-1 were transfused before test results were available, again underlining the need for stored blood, screened for both anti-HIV-1 and HBsAg by the Elisa test.
- Finally, blood given by voluntary blood donors may involve a lower risk of transmission of HIV-1, hepatitis-B virus and syphilis than blood from paid donors. Although payment does not affect the 'safety' of the blood, it may attract donors with higher rates of viral hepatitis and HIV infection [1, 12]. In our study the differences in the seroprevalence rates of voluntary donors and paid donors were significant for TPHA. Voluntary blood donor recruitment is essential for the provision of safe blood supplies in Kinshasa.

2018: Same, same but different

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More

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