Living Kidney Donor Transplantation in a Resource-limited Country: The Ivory Coast Experience

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ABSTRACT

Renal transplantation that offers a good quality of life still is not performed by the majority of countries of black Africa. We started a pilot project of renal transplantation in Ivory Coast 2 years ago. The present paper reports the preliminary results, difficulties related to the program, and perspectives regarding its expansion. Ten living related kidney transplantations have been performed over a 2-year period. Recipients and their respective donors were male. The mean age of the recipients was 42.8 years (22–57), and the mean age of the donors was 29.4 years (22–43). The mean number of mismatches was 3.2 (0–6). None was immunized. Recipients and donors were all EBV IgG positive and CMV IgG positive. All but 1 case were induced with basiliximab. The mean graft and patient survival time was 16.6 months (6–26). The mean cold ischemic time was 2.27 hours (1–3.32). The mean serum creatinine at discharge was 241.87 μmol/L (115.18–1063.2), at 6 months was 117.20 μmol/l (95.6–139.9), at 12 months was 104.55 μmol/L (62.02–132.9), and at 24 months was 104.55 μmol/L (62.02–132.9). The mean cyclosporine through level (C0) at 6 months was 137.57 ng/mL (70–366), at 12 months was 117.33 ng/mL (62–197), and at 24 months was 78 ng/mL. The mean cyclosporine 2-hour post-administration concentration levels (C2) at 6 months was 764.9 ng/mL (430–1421), at 12 months was 937.17 ng/mL (483–1292), and at 24 months was 690.66 ng/mL (488–853). Main complications were sepsis, adenovirus hemorrhagic cystitis, new-onset diabetes after transplantation, delayed graft function, polycythemia, and cytomegalovirus infection. No clinical rejection was diagnosed over the 2-year period. Patient and graft survival was 100% at a mean post-transplantation time of approximately 16.6 months.

CHRONIC KIDNEY DISEASE (CKD) is endemic all over the world and exhibits a particularly high incidence in black Africa. In resource-limited countries such as the Ivory Coast, CKD is not a priority for government programs because diseases such as malaria, HIV/AIDS, tuberculosis, and infantile diseases are considered to be of much higher public health importance. To date, the government has not yet integrated the management of CKD into the public health program. Furthermore, there is no evidence that a change in this government policy will occur in the near future. The high mortality rate attributed to end-stage renal disease (ESRD) has not yet drawn the government's attention to the fate of the affected populations. Renal transplantation remains the treatment of choice for ESRD patients because it offers the best quality of life and economic benefits. Furthermore, survival in transplanted patients is far better compared with patients who remain on dialysis [1]. Therefore, relatively wealthy patients from the Ivory Coast travel abroad to undergo kidney transplantation. Unfortunately, the survival of such patients is very

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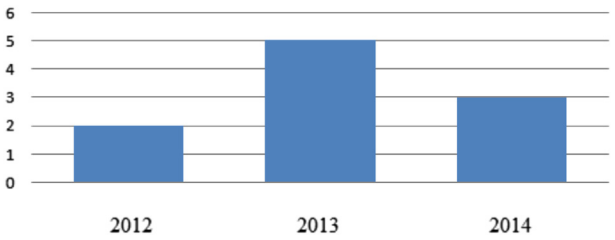

Fig 1. Evolution of the number of kidneys transplanted since September 2012.

poor because of the financial burden, the lack of appropriate follow-up [2], and because the procedures are performed in the setting of medical tourism [3]. Because living kidney donation can readily be performed in our country according to a survey performed approximately 10 years ago [4], it is unacceptable that kidney transplantation is not being performed in the Ivory Coast. Legislation regarding kidney donation was passed more than 20 years ago, and until January 2012, no action to regulate kidney donation had been taken. Based on our initiative and with the sponsorship of Novartis Pharmaceuticals, we were able to convince the government of the need to begin performing kidney transplantation. As a result, in September 2012, the first kidney transplantation ever in the history of French-speaking black Africa was performed. The preliminary results are presented in this report. Difficulties related to the program are exposed, and perspectives regarding the expansion of the program are outlined.

PATIENTS

Transplant recipients were adult males older than 16 years of age; all had end-stage renal disease, underwent dialysis in public and in private centers, and were from the French-speaking west black Africa region. The mean age of the recipients was 42.8 years, ranging from 22 to 57 years. All the recipients were PRA negative. The mean HLA mismatch was 3.2 (0–6). All recipients were positive for Epstein-Barr virus (EBV), immunoglobulin G (IgG), and cytomegalovirus (CMV). Donors were adult males older than 16 years of age. The mean age of the donors was 29.4 years, ranging from 22 to 43 years. They also were all EBV, IgG, and CMV IgG positive. Living related donor kidney transplantation was performed in all cases. All but 1 case was induced with basiliximab. We used thymoglobulin in 1 case. Maintenance immunosuppression comprised cyclosporine, sodium mycophenolate, and prednisone. The cyclosporine dosage was adjusted according to both the trough (C0) and the 2-hour post-administration concentration levels (C2). The AUC of cyclosporine was not performed in cases of discrepancy between the 2 values because of a lack of appropriate software. Therefore, during the first month post-transplantation, C0 was 250–300 ng/mL and C2 was approximately 1000 ng/mL. For the 2 subsequent months, C0 was 100–150 ng/mL and C2 was 800–1000 ng/mL. After the first 3 months, C0 was 75–150 ng/mL and C2 was 600–800 ng/mL, and after 1 year, C0 was 75–100 ng/mL and C2 was 500–600 ng/mL. Until recently, cyclosporine monitoring was performed abroad, and it took approximately 2 weeks to obtain the results. A private laboratory has recently begun performing the monitoring locally. So far, 10 patients have been transplanted: 2 in 2012; 5 in 2013, and 3 in 2014 (Fig 1).

METHODS

Patient and Donor Selection Process

Recipients willing to undergo transplantation presented to the nephrologists with their respective donors. They were instructed to have at least 2 or 3 potential donors to increase their chances of a compatible donor because most of the recipients had experienced blood transfusions and were likely to have donor-specific antibodies. Patients underwent biochemistry, viral, and radiological studies at an appropriate health center at their own expense. Immunological investigations regarding HLA typing, anti-HLA antibody testing, and cross matches were all performed at the Free University of Brussels in Belgium. All medications related to the intervention were paid for by the patients. Immunosuppressive drugs were available at private drug stores but not at public hospitals and were sold at cost price.

The Transplant Team

The transplant team consisted of a local team with 1 nephrologist, 2 surgeons, 2 anesthetists, and nurses. One surgeon from Belgium and 1 nephrologist from Tunisia also were included in the transplant team for their expertise. Their accommodations and their travel expenses and incentives were funded by the project, which is supported by Novartis Pharmaceuticals. The team was convened as soon as patients and donors were available. Therefore, the interventions were performed at a rate of approximately 1 every 3 to 4 months. The experts remained in the country only for the duration of the intervention (3–4 days). Postoperative management was performed by the local team.

Patient and Donor Preparation for Transplantation

Surgical preparation was performed in the same manner as for any other surgical intervention. The immunosuppression protocol included induction with basiliximab (Simulect) 20 mg on day 0 and 20 mg on day 4, and methylprednisone doses of 500 mg on day 0, 250 mg on day 1, and 125 mg on day 3. Thymoglobulin was used when the patient was immunized at a dose of 1 vial of 25 mg/10 kg per day for 3 to 5 days in administrations through a central venous catheter. The pace of the drug administration was adjusted according to the CD3 level calculated based on the white blood cell counts. Maintenance immunosuppression included cyclosporine (Neoral) 5 mg/kg/day bid adjusted based on both the trough level and the 2-hour post-administration concentration levels (C2), sodium mycophenolate 720 mg bid, and steroids 1 mg/kg/day once a day from day 4 to day 10, which was slowly tapered to 20 mg over 2 weeks, maintained for the 3 first months, and then reduced to 10 mg/day thereafter. Prophylaxis against opportunistic infections such as cytomegalovirus, fungi and P. jiroveci was administered.

Patient and Donor Surgical Interventions

Surgical procedures were performed at the Cardiology Institute of Abidjan, a local public hospital dedicated to the treatment of cardiovascular diseases, because it is a relatively well-equipped hospital