Objectives: In August 2004, a national organ transplant program utilizing the latest policies, procedures, and protocols was begun in Libya. During the first year of the program, 50 kidney transplantations from living donors were performed.

Materials and Methods: Forty-nine patients (aged 7 to 65 years) received kidneys from living-related donors (aged 19 to 54 years), and 1 husband received a kidney from his wife. Donor selection was based on human leukocyte antigen compatibility. Renal failure was due to chronic glomerulonephritis in most patients, diabetes in 5 adults, systemic lupus erythematosus in 2 adults, and congenital anomalies in 2 children. Sixteen patients matched the human leukocyte antigens of their donors, 28 matched 1 haplotype, and 6 did not match any haplotype. Immunosuppression was accomplished with methylprednisolone and basiliximab. Maintenance therapy was with mycophenolate mofetil, cyclosporine, and prednisone. The latter was completely discontinued 1 month after transplantation. In patients with resistant hypertension, unilateral native nephrectomy was carried out during transplantation. Donor nephrectomy was performed through an open mini-incision using a Thompson retractor.

Results: At the time of this writing, 49 patients are alive and well, and 48 of them have had functioning kidneys for 10 to 22 months. Three patients had acute rejections that were successfully treated with methylprednisolone (n = 1) or methylprednisolone and antithymocyte globulin (n = 2). At the time of this writing, all 46 adults and 2 pediatric recipients have excellent renal function and are living normal lives.

Conclusions: In terms of patient survival and quality of life, transplantation is superior to dialysis. Also, transplantation is less expensive than dialysis. In Libya, establishing an active and successful transplant program with early steroid withdrawal has brought many benefits to patients and their families and great financial savings to the government. Our program hopefully will provide a model for similar programs in Asia and Africa and encourage local governments to legalize organ procurement from cadaveric donors.

Key words: Living donor transplantation, New program, Steroid-free immunosuppression, Mini-incision open donor nephrectomy

Unlike most countries in the Middle East and North Africa, no active transplantation program was available in Libya until 2004. In 1988, a small transplant program was started at Al Zahra Hospital in Tripoli, Libya, by a group of surgeons from Poland. During the next 8 years, only 63 transplants were performed, and the transplant program was suspended in 1996. Since that time, more than 600 patients have received transplants outside Libya in several Middle Eastern and European countries from their living-related donors, and many purchased kidneys from living-unrelated donors. In August 2004, a new kidney transplant program was started at the Tripoli Central Hospital using appropriate policies, procedures, and protocols [1-3]. During the first year of this program, 50 renal transplants from living donors were performed, which is the highest number of transplants performed in most countries in the Middle East and North Africa during the first year of initiating a transplant programs [3, 4].
active transplant program and the results of transplantation in recipients, aged 7 to 65 years, from diverse social, cultural, background, and with a wide variety of medical issues.

**Materials and Methods**

During the 12-month period, from August 2004 to August 2005, 50 patients (aged 7 to 65; 38 males and 12 females) received kidney transplantations from living donors at Tripoli Central Hospital, Libya. Appropriate medical, psychological, immunologic, and radiologic evaluations were carried out for both donor and recipient. No patient was rejected because of age or other medical issues. Donor and recipient evaluations were based on histocompatibility matching and on appropriate medical, psychological, and ethical criteria [5]. Forty-nine donors (aged 19-54 years; 34 men and 16 women) were genetically related to the recipient, and 1 was emotionally related (wife to husband). Once donors and recipients were accepted, a computed tomography angiogram was carried out in the donor to determine the anatomic and functional status of the kidneys. Following this, a decision was made to remove the right or the left kidney. The causes of renal failure were chronic glomerulonephritis in 40 patients, diabetic nephropathy in patients, systemic lupus erythematosus in 2 patients, and congenital renal and ureteral anomalies in 2 children. Also, 10 patients were hepatitis C surface antigen positive, and 2 were both hepatitis B and C antigen positive. Fifteen patients were human leukocyte antigen (HLA) identical, 29 were 1 haplotype match, and 6 were less than 1 haplotype match with their donor. Three donors had double renal arteries in both kidneys.

Renal transplant and donor nephrectomy were performed simultaneously in 2 adjacent operating rooms. Donor nephrectomy was performed utilizing an open procedure that used a mini-incision of about 13-15 cm using a Thompson retractor. After nephrectomy, the kidney was perfused with cold histidine-tryptophan-ketoglutarate (HTK) solution and taken to the recipient room. In 3 patients who had uncontrolled hypertension, simultaneous unilateral native nephrectomy was performed on the side of the transplant as a treatment of their hypertension, as we previously reported [6]. Immunosuppression in non-HLA identical recipients included induction therapy, which was accomplished with basiliximab (20 mg on day 0 and 20 mg on day 4) and methylprednisolone intravenously (500 mg on day 0, 125 mg on days 1 and 2, 80 mg on day 3). Long-term immunosuppression was accomplished with mycophenolate mofetil (1000 mg twice daily and cyclosporine 4 to 8 mg per day to maintain a 12-hour blood level of 150 to 200 ng/mL). Prednisone was given according to the following regimen: 40 mg on days 4 to 7, 20 mg on days 8 to 14, and 10 mg on days 15 to 30. After day 30, no prednisone was given. Acute rejections were confirmed with needle biopsy and treated according to the following regimen: methylprednisolone (500 mg daily for 3 days) and if no response was achieved, antithymocyte globulin (ATG) was used (3 mg/kg daily for 7 to 14 days). Most recipients were discharged from the hospital between day 6 and day 8 after transplantation. Posttransplant management and follow-up were performed by the same transplant team, twice weekly for the first month, and at weekly intervals for the next 2 months. Since many patients came to the transplant center in Tripoli from distant parts of the country, they were advised to remain in Tripoli for the first 2 months after transplantation. When their renal functions had stabilized, they were referred to their nephrologists and subsequently seen at 3-month intervals. All donors left the hospital 4 or 5 days after donation and were followed as outpatients at weekly intervals for 1 month.

**Results**

At the time of this writing, 49 patients are alive and well, and 48 of them have had functioning kidneys for 10 to 22 months. One patient died 10 days after transplantation from uncontrolled hemorrhage around the graft, and another patient lost his graft 20 days after transplantation due to thrombosis of the renal artery. There were 3 acute rejections: 1 was successfully treated with methylprednisolone and 2 were treated with a combination of methylprednisolone and ATG. The 2 patients with systemic lupus erythematosus have been maintained with a small dose of prednisone (10 mg/day) in addition to cyclosporine and mycophenolate mofetil (MMF); they have excellent graft function with no recurrence of the disease. All 3 patients with hypertension who received simultaneous unilateral native nephrectomy have functioning grafts with normal blood pressure. The 2 pediatric patients (aged 7 and 9 years) who received a kidney transplant from their mothers have excellent renal function, are leading normal lives, and are back at school. The actuarial patient survival at 3, 6, 12, and 18 months is 98%,
96%, 96%, and 96%, and graft survival for the same period is 96%, 94%, 94%, and 94% respectively. All donors are in excellent health.

Discussion

The incidence of end-stage renal failure in Middle Eastern and African countries, including Libya, is over 120 per million population. Because of a lack of transplantation, the number of patients on dialysis is increasing each year. In Libya, with a population of about 5 million, some 2500 patients are on dialysis. It is well known that patient survival and the quality of life on dialysis are considerably inferior compared with transplantation, while the cost of dialysis treatment is several times the cost of transplantation [7-8]. Because of a lack of transplant programs, many patients from Libya had to travel to other countries to purchase kidneys from unrelated donors. It is well known that kidney transplantation from purchased organs has a negative impacts on patient and graft survival; on local transplant programs; and on the ethical, religious, and legal values of society [9, 10].

For these reasons, organ purchasing has been condemned by all major religions, all European and most Arab countries, and the World Health Organization (WHO). The establishment of a successful transplantation program in a country like Libya, in accordance with accepted medical, ethical, religious, social, and economic criteria should eliminate the need for organ purchases, and is essential to provide life-saving treatment for thousands of patients [10, 11].

In the first year of this program, 50 renal transplants from living donors were performed, which is the highest number of transplantations carried out in most countries in the Middle East and North Africa during the first year of starting their transplantation program [2, 4].

Our results confirm excellent transplant outcomes for kidneys from genetically and emotionally related living donors [11]. The results also show that poor HLA match is not a contraindication for living donor kidney transplantation, as has been previously reported [12]. Likewise, unilateral native nephrectomy at the time of transplantation confirms our previous finding of the safety and effectiveness for treating dialysis-resistant hypertension [6]. Also our findings confirm previous reports that hepatitis-B- and hepatitis-C–antigen positive statuses are not contraindications to renal transplantation, since our results show good graft and patient survival in these patients [13, 14]. Our immunosuppression protocol, with early steroid withdrawal, has many clinical benefits and minimizes the many adverse problems associated with prolonged steroid use, as shown in many studies [15-17].

Conclusions

In the first year of a kidney transplantation program in Libya, using recognized medical, technical, and immunologic protocols, 50 live donor renal transplants were carried out in patients aged 7 to 65 years from living genetically related donors in 49 patients and emotionally related in 1 patient, with excellent outcomes. Immunosuppression included induction therapy with basiliximab in non-HLA identical recipients, and maintenance therapy with MMF, cyclosporine, and prednisone. The latter was discontinued at 1 month. The incidence of acute rejection was less than 6%. Currently, 49 patients are alive and well, and 48 of these have excellent graft function for periods of 10 to 22 months with actuarial patient survival of 98%, 96%, and 96% at 6, 12, and 18 months. By establishing such an active transplant program as the one in Libya today, numerous benefits will be achieved for the many patients and their families who would otherwise be on long-term dialysis. In addition, by reducing the number of patients on dialysis including those who would travel to other countries for kidney purchase, a considerable financial savings for the local government is achieved.

It is also expected that such a successful transplant program from living donors will encourage the introduction of an appropriate law legalizing organ procurement from deceased individuals (cadavers) in Libya, as is the case in other Middle Eastern countries, so that more kidneys and other organ transplants will be performed each year. This would have the added benefit of eliminating the need to purchase organs from other countries.

References