



## REVIEW ARTICLE

### CHARACTERISTICS OF THE PATIENTS UNDER KIDNEY TRANSPLANTATION IN MADAGASCAR

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#### ARTICLE INFO

##### Article History:

Received 20<sup>th</sup> October, 2018

Received in revised form

19<sup>th</sup> November, 2018

Accepted 24<sup>th</sup> December, 2018

Published online 30<sup>th</sup> January, 2019

##### Keywords:

Chronic kidney disease,  
Donor, Kidney transplantation,  
Madagascar, Recipient.

#### ABSTRACT

Chronic kidney disease is worldwide public health problem. Inaccessibility for treatment is common in developing countries. In Madagascar, among patients with end stage renal disease, less than 3% have an accessibility for kidney transplantation. The goal of the study is to determine the characteristics of the patients who benefitted kidney transplantation. We have conducted one retrospective study in two centers in the Capital. We included all patients kidney transplanted from 1st of January 1987 to 31st of December 2016. All characteristics of the patients before and after kidney transplantation were recorded. We followed patients for one year. A total of 27 patients kidney transplanted were included. Mean age were 43.5 ans. Sex-ratio were 1.2. In 85.2%, Kidney transplantation were done in patients from rich socioeconomic categories. All transplantation were done with living and relatives donors and were done abroad (India, Egypt and south Africa). Creatinine level of recipient were respectively 837Umol/l and 97Umol/l before and after kidney transplantation. Wysolone, tacrolimus and mucophenolate mofetil were the most useful immunosuppression therapy. Survival rate one year after transplantation were 96.3 %. Madagascar's kidney transplantation rate is very low because of non-availability of the transplantation surgery in the country. There are also some reasons as lack of legal framework, public opinion strongly influenced by the fear of organ trafficking, some religious aspects and lack of trained specialists, and laboratories infrastructures. Our challenge is to practice the surgeon in Local Hospital. To rich the goal, mental, ethical, professional, infrastructure challenges must be first of all considered.

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## INTRODUCTION

Chronic kidney disease is worldwide public health problem mainly in developing countries (Umezurike Hughes, 2016; Ramilitiana et al., 2016). Many studies have reported that it gives a long survival, improves quality of life and less expensive compared to a chronic dialysis (Elsharif et al., 2010; Ali et al., 2016; Shroffa et al., 2007). But its accessibility concerns only less than 10% of the patients who needs it in low-income population mainly in some countries in Africa (Umezurike Hughes, 2016; Aviels-Gomez et al., 2006; Rizvi, 2003). In Madagascar, According to a recent study, chronic kidney disease (CKD) represents about 8.5% of hospitalisation and it affects particularly young and active people (Ramilitiana et al., 2016). Among patients suffering of End stage Renal Disease (ESRD), less than 3% have an accessibility to kidney transplantation(2). The aim of this study was to describe the characteristics of the population of patients who could undergo renal replacement therapy by kidney transplantation.

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## MATERIALS AND METHODS

To attend the goal, we have conducted this descriptive, retrospective and multicenter study. It includes both Nephrology wards at University hospitals of Befelatanana and Ampefiloha, in Antananarivo, the Capital of Madagascar. It included all kidney transplanted patients from the 1st of January 1987 to 31st of December 2016 with at least one year of medical follow-up. We collected all information from the data of hospitals. All clinical and biological characteristics of the patients before and after kidney transplantation were recorded.

## RESULTS

A total of 27 kidney transplanted patients were included with male predominance. Sex-ratio was 1.2. As recipient's characteristics, mean age was 43.5 years, ranged from 24-56. In 74% of the cases, recipients's age ranged from 18 to 50 years old. Mean estimated -Glomerular Filtration Rate (e-GFR) was 7 ml/mn/1.73m<sup>2</sup>. According to the causes of CKD, glomerular nephropathies due to diabetic and vascular nephropathies were the main cause of CKD in 77.4% of cases,

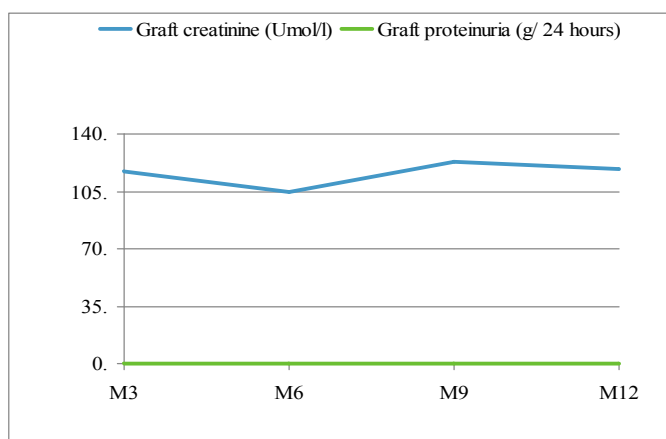
followed by other glomerular nephropathies in 11.1% and tubulo-interstitial nephropathies in 7.5%. Mean creatinine level before kidney transplantation were 837  $\mu\text{mol/l}$  and mean e-GFR was 7  $\text{ml/min/1.73m}^2$ . In the 85% of the cases, they were from high socioeconomic categories and in 15%, they were from middle socioeconomic with medical charge covered by the Government. All Recipients' characteristics are summarized in Table 1. As donor's characteristics, mean age were 38 years. Sex-ratio were 4.4. All donors were living and relatives donors. Donor's non eligibility was mainly due to chronic infections (HIV, Chronic hepatitis) age ( $< 18$ ,  $> 60$  years) and presence of diabetes and hypertension. Donors' characteristics are showed in Table 2. Average preparation delay from decision to transplantation was 12 months (4 - 48 months). Kidney transplantation surgeries were done abroad, in India (92%), Egypt (4%) and South Africa (4%). Global costs ranged around 25.000USD. After kidney transplantation, local medical follow-up started in the 3rd months after surgeon intervention. In the first observation, the mean Graft creatinine were 117  $\mu\text{mol/l}$  and the mean proteinuria were 0.2g/24 H. In the first year after transplantation, the mean Graft creatinine were 116  $\mu\text{mol/l}$  and the mean proteinuria were 0.13g/24 H. Creatininemia and proteinuria evolution in one year after transplantation are shown in Figure 1. Prednisolone, tacrolimus and mycophenolate mofetil were the most frequently used immunosuppressors. Survival rate at one year post transplantation was 96.3%. Complications were mainly due to infections like pneumocystis infectious.

**Table 1. Characteristics of recipients (N=27)**

Recipient's characteristics	Mean	Ecart-Type
Serum creatinine ( $\mu\text{mol/l}$ )	837 (366 - 2400)	+/- 388
Urea ( $\text{mmol/l}$ )	45 (28 - 75)	+/- 14
Hemoglobinemia ( $\text{g/dl}$ )	7.2 (5 - 11)	+/- 2.5
Proteinuria ( $\text{g/24hours}$ )	8 (0,5 - 5)	+/- 1.4

**Table 2. Characteristics of donors (N=27)**

Donor's characteristics	Frequency	Percent
<b>Age (years)</b>		
> 18 - 45	22	81.5
> 45 - 60	5	18.5
<b>Sex</b>		
Female	5	18.5
Male	22	81.5
<b>Donation</b>		
Living donor	27	100
Cadavericdonor	0	0
Relative donor	27	100
Non relative donor	0	0



**Figure 1. Evolution of the graft creatinine and proteinuria one year after kidney transplantation (N=27)**

## DISCUSSION

Treatment of CKD is a problem of public health issue (Elsharif *et al.*, 2010). Kidney transplantation is now the treatment of choice for most patients with ESRD. Madagascar's kidney transplantation rate is very low. The principal cause is mainly the non-availability of the transplantation surgery in the country. There are also many considerable reasons as the lack of legal framework governing brain death, some religious aspect which forbidden organ donation, cultural and social constraints which delight the trafficking organs, the lack of trained professional and adequate laboratories for kidney transplantation. In Sudan, Hisham and al. reported in their study that kidney transplantation concerns 28 % of the total provided renal replacement therapies. And this low renal transplant rate was due precisely in 24.2 % to financial constraints, in 21% the lack of medical fitness and in 20 % the absence of a suitable kidney donor while in 12%, patients choised to continue dialysis (Abdelwahab *et al.*, 2013). In Nigeria, financial constraints delayed transplants in 66% and the non availability of donor in 17.2% (Umezurike Hughes, 2016). Kidney transplantation is then accessible only for young and active people from high socioeconomic class inducing disparity care among patients with ESRD (Harding *et al.*, 2017; Ladin *et al.*, 2009; Patzer *et al.*, 2009). Many studies has specified that Treatment of ESRD is only accessible for rich patients (Elsharif *et al.*, 2010; Ladin *et al.*, 2009). There were any case of preemptive renal in this study. Preemptive renal is the first renal replacement therapy mainly in young patients and it may avoids also the complications of dialysis (Huang *et al.*, 2012). Preemptive transplant is encouraged in population in Madagascar where continuous chronic hemodialysis is inaccessible for all and using catheters as access vascular induces infectious complication (Ranivoharisoa *et al.*, 2016). Compare to another countries in Africa, recipients have similar age as other african kidney transplanted. According to Umerizike and al, mean age of recipients was 45 (Umezurike Hughes, 2016). In contrast with another countries where recipients are more older (Akoh *et al.*, 2013; Feng *et al.*, 2003).

However, many studies reported that the donor's age may affects on short and long term outcome of kidney transplantation (Øien *et al.*, 2007). Cecilia and al. have reported one study including 739 living donor and follow graft survival in median follow up time of 55 months. They concluded that graft survival was not affected by donor age above 50 years old and conclude that donors's age seems to be a more important predictor of graft mainly with group other than 65 years (Patzer *et al.*, 2009). In Madagascar, kidney transplantation is allowed only for living and relating donation which may be one factor explaining a low rate of kidney transplantation. The reason is mainly the absence of legal framway for cadaveric donation and the lack of some infrastructure aspects as tissue typing laboratory, a lack of training intensivists and others specialists. To make it face, it needs also a great ethical and mental challenge for malagasy people. Madagascar country needs in fact a change in public perception around deceased donation. A national program for kidney transplantation and organ donation including living and deceased donor may also proposed for the Malagasy Government. Many countries as India and Croatia has already started this program with successful challenge (Mandal *et al.*, 2003; Abraha *et al.*, 2016). Some countries in Africa begun to practice cadaveric donation like in South Africa (Muller, 2016). Others europe countries are advanced in practicing

cadaveric donation and its fact increases the pool of kidney Transplantation (Spasovski *et al.*, 2012). In Madagascar, the mean age for donor was 38 years with survival rate in 96.3 % one year after transplantation. But our study couldn't demonstrate the survival rate in long term. Almost of the african patients in developing countries treat in India (Umezurike Hughes, 2016). And its costs around about 25 000 dollars for every local expences. Its inaccessibility for all patients is due to travel expenses. The demand for renal transplantation has increase in Madagascar due to the growing prevalence of the ESRD (Umezurike Hughes, 2016) and intervention should really practice in local hospital to improve the accessibility of the treatment. Project of renal transplantation started in Madagascar for a long time. And the the first kidney transplantation was done in 1987 in women patient who is still followed up in the country untill this time. To rich this goal for kidney transplantation, many steps must be done. First of all, the great fact that must be considered should foccus on validation of the legal framway, this legal framway which should accept living and cadaveric donation to increase the pool of kidney transplantation.

A national program for kidney transplation and organ donation could be promoted. We propose also to implant in all Dialysis and nephrology services the project for kidney transplantation. Education therapeutic for patients with ESRD should be also developed to encourage the family to give their own kidney. A part, professional and infrastructure challenge should be improved as training program for kidney transplantation for intensivists, surgeon, biologists, urologists, nephrologists. Project for kidney transplation is a need for malagasy's people but its realisation is still needing a multidisciplinary teams collaboration.

## Conclusion

To conclude, renal replacement therapy by kidney transplantation is the best treatment of End stage renal disease. In developing countries were kidney disease affects mainly young people, it can be the ideal treatment as Madagascar's case. This study conclude that kidney transplantation rate is very low in Madagascar. Then, it is only accessible for patients who are from high socioeconomic level or patients in middle socioeconomic class which medical charge covered by the government. Living and relatives donors show a good outcomes for short survival rate. To improve the accessibility of ESRD care, our challenge is to practice the surgeon in Local Hospital. It may be benefits for all patients and avoid disparities care offered to patients with ESRD. To rich the goal, mental, ethical, professional, and infrastructure challenges must be first of all considered.

## Acknowledgements

Special thanks to:

Urology service A, Ampefiloha University Hospital,  
Antananarivo Madagascar  
Urology service B, Ampefiloha University Hospital,  
Antananarivo Madagascar  
Nephrology service, Ampefiloha University Hospital,  
Antananarivo Madagascar  
Nephrology service, Befelatanana University Hospital,  
Antananarivo Madagascar

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