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Causes of Original Kidney Disease among Libyan Kidney Transplant Recipients

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Abstract

Introduction End-stage renal disease (ESRD) has become a significant problem in the North African region. There are few references about the primary causes of ESRD in kidney transplant (KT) recipients. The **aim** of this study was to determine the causes of the original kidney disease in KT recipients in Tripoli Central Hospital, Tripoli, Libya.

Methods This is a hospital-based, retrospective descriptive study. It includes all KT recipients who were followed up in the outpatient clinic, at the Libyan National General Authority for Organ, Tissue, and Cell Transplantation and nephrology clinic in Tripoli Central Hospital during 2021, Tripoli, Libya.

Results Data on 360 KT recipients were retrieved. Sixty-eight percent of the of the patients were males: 31.1% of all enrolled individuals were between 31 and 40 years. Patient mean age was 36.66 ± 11.86 years. The most common validated cause for ESRD was unknown (55.3%), followed by chronic glomerulonephritis (CGN; 15%), diabetes mellitus and systemic hypertension each equally (10.3%), congenital abnormalities (3.6%), polycystic kidney disease (3.3%), and nephrolithiasis (1.9%).

Conclusion Original cause of kidney disease in most recipients was undetermined, possibly due to limited diagnostic tools or delayed presentation. However, CGN is a main known cause.

Keywords
- kidney transplant
- ESRD
- chronic glomerulonephritis
- etiology
- Tripoli

Introduction

Chronic kidney disease (CKD) is the progressive loss in kidney function over several months or years. It affects approximately 1 in every 10 people worldwide.[1] CKD is a pathophysiological process with different causes in various demographic groups that often leads to end-stage renal disease (ESRD).[1,2] ESRD is an irreversible loss of kidney function that leads to reduced quality of life and significant economic burden due to its high prevalence, complicated treatment, and high economic expenses; the annual cost for CKD and ESRD is approximately $48 billion and $32.9 billion, respectively.[3–6] ESRD has been rising globally, owing to the population aging, and increasing prevalence of diabetes mellitus (DM) and hypertension (HTN) as the main causes.[3,7,8] Most of the developing countries do not have a patient registry system, which leads to the lack of an exact number of patients with CKD and ESRD, making it difficult to conduct research.[9] According to a study in 2012, in Libya, the prevalence of dialysis-treated ESRD was 624 per million population, with an annual increase of 8%.[10]

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Renal Replacement Therapy (in the form of dialysis or kidney transplant) has become an essential method of treatment for ESRD.[3] Kidney transplant (KT) provides a higher quality of life to patients with ESRD, and it is a more cost-effective option than dialysis; therefore, kidney transplantation nowadays is the best available therapy for ESRD patients.[11,12] Finer and more financially applicable options than dialysis or kidney transplantation for ESRD are not expected in the near- or even mid-term future.[13]

Confidently identifying the etiologic causes of ESRD is key to implement the most effective treatment plan and significantly reduce associated costs.[14] Therefore, this study aimed to determine the causes of original kidney disease in KT recipients.

Materials and Methods

This is a retrospective descriptive study conducted at Tripoli Central Hospital. The study included KT recipients with follow-up in the outpatient clinic at the Libyan National General Authority for Organ, Tissue, and Cell Transplantation and Nephrology Clinic of Tripoli Central Hospital in 2021. Demographic data like age and sex at transplantation were collected, along with the original cause of ESRD. The data were analyzed using SPSS version 25. The results are presented in two ways: categorical data were reported as frequencies and percentages, and continuous variables were presented as means and standard deviations. The chi-square test was used to analyze qualitative data, with a significance level set at a *p*-value less than 0.05.

Results

Data on 360 KT recipients were retrieved. Our transplant recipients had a mean age of 36.7 ($\pm$11.9) years standard deviation. The youngest was aged 13 years and the oldest was 68 years.

The most common age group was 31 to 40 years (31.1%), followed by 21 to 30 years (28.6%; ►**Table 1**).

Most of the transplanted recipients were males (67.8%), with a male to female ratio of 2:1.

The causes of previous ESRD in the transplanted recipients were demonstrated in ►**Table 2**, which shows chronic glomerulonephritis (CGN) being the most commonly known cause (15%), followed by DM and HTN each reported in 10.3% of the studied group. Congenital causes were reported in 3.6% and polycystic kidney disease (PKD) was reported in 3.3%.

Table 1 Age groups of the studied patients

Age group (years)	Frequency (*n*)	Percentage
$\leq$20	24	6.7
21 to 30	103	28.6
31 to 40	112	31.1
41 to 50	61	16.9
51 to 60	52	14.4
>60	8	2.2
Total	360	100

Table 2 Original kidney disease (causes of end-stage renal disease) of the group

Causes of ESRD	Frequency (%)
Unknown	199 (55.3%)
CGN (primary + secondary)	54 (15%)
DM	37 (10.3%)
HTN (essential + preeclampsia, renal artery stenosis)	37 (10.3%)
Polycystic kidney disease	12 (3.3%)
Congenital (VUR, PUV, Hyperoxalosis, horseshoe kidney, agenesis)	13 (3.6%)
Nephrolithiasis	7 (1.9%)
Drugs	1 (0.3%)
Total	360 (100%)

CGN, chronic glomerulonephritis; DM, diabetes mellitus; ESRD, end-stage renal disease; HTN, hypertension; VUR, vesicoureteral reflux; PUV, posterior urethral valve.

The unknown cause in the studied group was high, reported in (55.3%) of the transplant recipients.

The age of the recipient was found to have a significant change on the cause of ESRD of the studied patients (*p*-value was 0.000). This was observed even after excluding the unknown causes.

In patients less than 20 years of age, congenital abnormalities were the top cause of ESRD, reported in 38.5%. In patients above the age of 50 years, DM (45.9%) followed by HTN (40.5%) were the most common causes of ESRD (►**Table 3**).

Discussion

ESRD has recently become a worldwide problem, and ESRD in Libya has also largely increased in recent decades. According to WHO data published in 2012, the incidence of dialysis-treated ESRD is 282 per million population (pmp), and the prevalence of dialysis-treated ESRD is 624 pmp.[10,15]

Most recipients were males (68%) in the present study, which is going with their predominance in the prevalent dialysis population (58%) in our country, as reported by Alashek et al[10]. However, Habas et al[16] reported that CKD is slightly more common in females.

The predominance of males receiving KT was also reported in other studies.[11,17] This may be related to socio-cultural factors in the region or higher prevalence of ESRD in males.[6,14,18]

Our results show that the mean age of transplant recipient was 36.7 $\pm$ 11.9 years and approximately 65% of patients were less than 40 years. In our opinion, this indicates that the ESRD in Libya affects the economically productive age group. This is in concordance with studies in Egypt,[11] Sudan,[19] Turkey,[14] and Nigeria.[17] However, this is unlike the case in many developed countries where the mean age of ESRD

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Table 3 Distribution of the causes according to the age group of the patients

Causes/age group (years)	≤20	21 to 30	31 to 40	41 to 50	51 to 60	>60
Unknown	13 (6.5%)	67 (33.7%)	72 (36.2%)	32 (16.1%)	13 (6.5%)	2 (1.0%)
CGN	6 (11.1%)	20 (37%)	20 (37%)	4 (7.4%)	4 (7.4%)	0 (0%)
DM	0 (0%)	7 (18.9%)	7 (18.9)	6 (16.2%)	17 (45.9%)	0 (0%)
HTN	0	0	8 (21.6%)	11 (29.7%)	15 (40.5%)	3 (8.1%)
PKD	0	1 (8.3)	1 (8.3%)	6 (50%)	3 (25%)	1 (8.3%)
Nephrolithiasis	0	2 (28.6%)	2 (28.6%)	1 (14.3%)	0	2 (28.6%)
Congenital causes	5 (38.5%)	6 (46.2%)	1 (7.7%)	1 (7.7%)	0	0
Drugs	0	0	1 (100%)	0	0	0
Total	24 (6.7%)	103(28.6%)	112(31.1%)	61 (16.9%)	52 (14.4%)	8 (2.2%)

Abbreviations: CGN, chronic glomerulonephritis; DM, diabetes mellitus; HTN, hypertension; PKD, polycystic kidney disease.
Percentage within the cause, *p*-value was 0.000.

patients is generally over 60 years,[20] and the median age of the transplant recipients was 48 years.[21]

Our result reveals that CGN is at the top of the known causes of ESRD in transplant recipients with 15%, this was in-line with a previous study by Habas et al,[16] who demonstrated that CGN is the first cause of CKD in the studied Libyan patients. In addition, Alashek et al[10] found that CGN in those less than 50 years of age was the most common cause (32.6%).

Our results were also comparable with that in Egypt, in which CGN was a major cause of ESRD, although it was much lower than our results with only 8.4%.[11]

In a study done in Bangladesh and Nigeria, CGN was also one of the top causes of ESRD, but it was fairly higher than our result. It was reported in 61.6 and 32.5% of cases, respectively.[17,22]

In the Sudan study, CGN was the first cause of ESRD, reported in 29.3% of patients less than 40 years old.[19]

In the developed countries, CGN was also found to be a major cause of ESRD in transplant recipients, although it had a higher percentage (26.6%),[21] which can be explained by their advancement in diagnostic facilities which are limited in our country.

In our study, the cause was not identified in 55.3% of the cases. This large percentage might be attributed to the late presentation of the patient. This result was almost similar to that of an Egyptian study (60%).[11] But it was higher than that reported in Bangladesh study (5.32%)[22] and in Nigeria (17.5%).[17]

HTN represented 10.3% of the causes of ESRD in our patients which was higher than that reported in Egypt and Bangladesh.[11,22] However, this was less than that reported in Nigeria (23%).[17]

According to the organ procurement and transplantation network (OPTN)/the scientific registry of transplant recipients (SRTR) 2019 Annual Data Report, DM and HTN were on the top of the causes of ESRD in patients on the waiting list for kidney transplantation.[23]

PKD in our study reported in 3.3% and this was comparable with that reported in Egypt, Bangladesh, and Nigeria.[11,12,22]

Our study revealed a significant effect of the age on the cause of ESRD in our patients and in those less than 20 years of age; congenital causes including obstructive uropathy, were the primary cause of ESRD, reported in 38.5%. In Egypt the obstructive uropathy reported in 16.3% of young patients.[11] CGN was accounted for 11% of the causes in this age group which is in-line with that reported in Egypt (13%).[11]

Conclusions

It is imperative to dedicate greater effort toward identifying the underlying kidney disease prior to proceeding with a kidney transplant. The unidentified origins of the disease may be indicative of limited diagnostic tools for kidney diseases or an inadequate data registry. Chronic glomerular disease (CKD) is a major cause of ESRD in transplant recipients.

Compliance with Ethical Principles

Although the study does not put any human subjects at any risk, approval was granted by the scientific committee of the transplant center. All data were collected anonymously.

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None.

Conflict of Interest

None declared.

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