

## Original Research Article

# Patterns of ocular morbidity among kidney transplant recipients in Ethiopia

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### ABSTRACT

**Background:** Of all organ transplant procedures renal transplantation has become a very successful and routine procedure. Saint Paul's Hospital Millennium Medical College is a pioneer and is the only center providing kidney transplant in Ethiopia. Even if this is a life changing and exiting addition to the countries' health service coverage, its long term outcomes including various complications is not yet assessed. Therefore, the aim of this study is to describe ocular morbidities among kidney transplant recipients in Ethiopia.

**Methods:** Cross sectional descriptive study was undertaken from October 2017 to December 2018.

**Results:** There were a total of 135 individuals who underwent renal transplant procedure including 95 (70.4%) male and 40 (29.6 %) female. The median age was 32 years. The cause of renal diseases is not known in majority 112 (83%) of the study subjects. More than 95% of all the study subjects were on multiple immunosuppressant therapy. Of all the individuals examined 128 (94.8%) of them have one or more ocular morbidities. Dry eye 76 (50.7%), optic neuropathies 12 (8%), retinal pigmentary changes 11 (7.3%) and cataract 9 (6%) were frequently observed eye morbidities. There were no significant sight threatening conditions observed in relation to the immunosuppressive therapy or the diseases itself.

**Conclusions:** Dry eye is the commonest eye morbidity among kidney transplant patients.

**Keywords:** Kidney transplant, Immunosuppressive, Morbidity, Ethiopia

### INTRODUCTION

Organ transplantation has evolved over many years. Kidney transplantation has become a very successful and routine procedure in now a day. With near optimal rates of transplant patient survivals, the focus has shifted to the alleviation of complications that can improve outcomes. Advances in surgical technique and development of more effective immunosuppressive agents have rendered kidney transplantation an effective renal replacement therapy. Pharmacologic immunosuppressant like steroids, cyclosporine and tacrolimus has played a major role in the advancement of these transplantation procedures.

However, immunosuppressant has been shown to carry the risk of many complications.

Ocular complications following renal transplantation are mainly secondary to age, immunosuppressive therapy (Steroids) and the cause of the underlying renal disease diabetes (DM), hypertension (HPN) and accumulation of noxious materials.<sup>1</sup> There are many studies mentioning that most of the ocular complications following renal transplantation are recognized as secondary to immunosuppressive drugs, especially to the use of corticosteroids.<sup>2-5</sup> Steroid induced cataract is a common ocular complication that occurs in post renal transplant patients due to prolonged duration of use. It can be seen

in as high as 62.5% of cases.<sup>2</sup> Increased intraocular pressure was found in 12.5% 2 and 20% 6 of all the renal transplant cases. In another report with different description, anterior segment problems identified include conjunctival degeneration 36.6%, posterior sub-capsular cataracts 24%, pinguecula 17.3%.<sup>7</sup> Among the posterior segment findings pigmentary changes in the choroid and retinal pigment epithelium were seen in as high as 14% retinal vein occlusions seen in 3.3% 7, 1.4%. 2 Arteriovenous crossing changes in 8.6%, proliferative diabetic retinopathy (PDR) in 6%, central serous chorioretinopathy in 3.3%, and non-proliferative diabetic retinopathy(NPDR), optic nerve atrophy and diabetic macular edema each in 2.7%.<sup>7</sup>

Cyclosporine is one of the commonly used immunosuppressive drugs used for renal transplant patients. It is implicated in the development of optic nerve head edema and pseudotumour cerebri, sixth nerve palsies and ptosis, and visual loss.<sup>8-11</sup> Tacrolimus is a relatively new immunosuppressive agent that is particularly indicated in liver transplantation and bone marrow transplantation. It is also used in renal transplant patients these days. The other new immunosuppressive agent used and show a promise in graft survival is MMF (mycophenolate mofetil).

Opportunistic infections like cytomegalovirus ocular infection and herpes simplex ocular infections are the other problems detected in these group of patients.<sup>12</sup> CMV(cytomegalovirus) infections were seen in 2.8%, 2 5%, 5 8% 6 of renal transplant cases and it was attributable to the immunosuppressive drug therapy.<sup>5</sup>

Saint Paul’s Hospital Millennium Medical College is a pioneer and is the only center providing kidney transplant in Ethiopia. Even if this is a life changing and exiting addition to the countries health service coverage, its long term outcomes including various complications is not yet assessed. Therefore, the aim of this study is to describe ocular morbidities among kidney transplant recipients at SPHMMC.

**METHODS**

This study was a cross sectional descriptive study undertaken from October 2017 to December 2018 at St. Paul’s Hospital Millennium Medical College. The kidney transplant centre was established in 2016 in collaboration with University of Michigan, USA. It is the only centre in Ethiopia to provide the kidney transplant service. Up to the compilation of this report there were 137 transplant patients attending at the centre. Two were critically sick at the time of data collection. After verbal informed consent 135 subjects were willing to undergo the eye check and eye examination was done by ophthalmologist after taking the participants to ophthalmology department. A complete ocular examination including best corrected snellen visual acuity (BCVA), refraction, ocular motility and external eye examination, slit-lamp

biomicroscopy, applanation tonometry and funduscopy including optic nerve evaluation was done using a non-contact 90 diopter lens following pupil dilation with tropicamide 1%. For those with suspected optic neuropathy color vision test and HVF (humphrey visual field) test was done. Dry eye assessment was done by tear film breakup time (TBUT) test that measures the amount of time that takes for tears in a fluorescein-stained eye to break up after blinking. The tear film is examined using the slit lamp and blue filter to scan for dry spots on the cornea. TBUT less than 10 seconds were taken as abnormal. Nephrologic history including underlying disease causing ESRD (end stage renal disease), post-transplant duration, duration of pre-transplant dialysis and immunosuppressive regimens used were recorded from the patient’s chart. The data was checked for completeness immediately after data collection and incomplete information was corrected immediately before the patient leaves the clinic.

Ethical clearance was obtained from SPHMMC institutional review board (IRB).

**RESULTS**

During the study time there were a total of 135 renal transplant subjects including 95 (70.4%) male and 40 (29.6 %) female. The median age was found to be 32 years, the minimum age was 10 years and the maximum was 69. Most of them 128 (94.8%) were living in urban area (Table 1).

**Table 1: Socio demographic characteristics of kidney transplant cases at Saint Paul’s Hospital Millennium Medical College, Addis Ababa, Nov/2018 (n=135).**

Socio demographic characteristics	Category	Number (%)
Age (in years)	<20	11 (8.1)
	20-40	95 (70.4)
	>40	29 (21.5)
Sex	Male	95 (70.4)
	Female	40 (29.6)
Place of residence	Urban	128 (94.8)
	Semi-urban	7 (5.2)

Ninety-two (68%) of them were done the procedure locally in Ethiopia and the rest 43 (32%) were patients who follow at the center but done the surgery abroad. All of the study subjects received kidney from live related donors.

The cause of ESRD is not known in majority of the study subjects 112 (83%), and the remaining 23 (17%) had a known chronic disease like hypertension, diabetes, obstructive nephropathy and glomerulonephritis constituting 9 (6.7%), 7 (5.2%), 5 (3.7%) and 2 (1.5%) respectively (Table 2).

**Table 2: Causes of end stage renal disease among renal transplant patients.**

Cause of ESRD*(n=135)	Number (%)
Unknown	112 ( 83.0)
Hypertension	9 ( 6.7)
Diabetes mellitus	7 (5.2)
Obstructive nephropathy	5 (3.7)
Glomerulonephritis	2 (1.5)
<b>Total</b>	<b>135 (100)</b>

\*ESRD= End stage renal disease

More than half of the study subjects 76(56.3%) did waited for more than a year after the diagnosis of kidney failure before undergoing the surgery whereas only 5 (3.7%) of the cases undergo the transplant surgery within six months' time after the diagnosis. Almost all of the study subjects were on dialysis during the period before kidney transplant surgery and after diagnosis. At the time of eye evaluation 75 (55.6%) of the subjects already passed more than one year after the transplant surgery while 36 (26.7%) of them had post-transplant time six months but not a year and the rest 24 (17.8%) were done the transplant surgery just within six months.

**Table 3: Types of ocular morbidity identified among renal transplanted patients (n=150) .**

Ocular disorders	Number (%)
Dry eyes	76 (50.7)
Optic neuropathies	12 (8)
Retinal problems	11(7.3)
Blepharities	9 (6)
Cataract	9 (6)
Corneal opacity	8 (5.3)
Conjunctival degenerations	8 (5.3)
Vitreous opacity and PVD*	6 (4)
Others	11(7.3)

\*PVD - posterior vitreous detachment

More than 95% of all the study subjects were on multiple immunosuppressant therapy. The most commonly used immunosuppressant include mycophenolate mofetil (MMF) (65%), prednisolone (72%), cyclosporine (22%) and tacrolimus (82%). The post-transplant immunosuppressive regimen consisted of triple therapy in 128 (94.8%), single therapy in 1 (0.7%), dual therapy in 6 (4.4%) of study subjects. In addition to the immunosuppressant therapy, multiple adjuvant treatments (more than three) were given to 107 (79.3%) of the transplants while dual adjuvant treatment were taken by 26 (19.3%) of the cases. The most commonly used adjuvant treatments include cotrimoxazole (72%), Pantoprazole (69%) and amlodipine (70%). Only 5 (3.7%) of the study subjects had eye checkup prior to the current study. Visual acuity assessment shows, 131 (97%) of them have normal visual acuity (V/A>6/18) whereas 3 (2%) of them have visual impairment (V/A 6/18-3/60). None of the patient had intraocular pressure

(IOP) more than 21 mmHg. Refractive error was seen in 78 (57.8%) of the study subjects among these presbyopia was detected in 30(22.2%), myopia 19(14.1%), hyperopia in 26 (19.3%) and astigmatism in 3 (2.2%).

Of all the individuals examined 128(94.8%) of them have one or more eye problems. The most prevalent ocular morbidity detected was dry eye, seen in 76(50.7%). Cataract was identified in 9(6.0%) of the subjects. Two of the study subjects already done cataract surgery. Lid and conjunctival problems like blepharities and conjunctival degeneration were diagnosed in 9(6.0%) and 8 (5.3%) of the transplant patients respectively. Eleven (7.3%) of the cases found to have retinal problems and 12 (8.0%) of them have optic neuropathies. Majority of the retinal issues were pigmentary changes and two of the study subjects had long standing retinal detachment. Among the 12 subjects with optic neuropathy, two of them had glaucomatous optic neuropathy which was first detected during this study (Table 3).

Overall treatment provided to 118 (87.4%) of the study subjects. Fifty (37%) of them were given eye drop & eye glass prescription, 24 (17.8%) of the cases were given an eye drop only and 44(32.6%) were given eye glass prescription only. Follow up link to the department of ophthalmology was facilitated for 12 (8.9%) of the cases who need subsequent follow up.

**DISCUSSION**

The frequently observed ocular morbidities in these groups of patients is not found to be vision threatening which was evidenced by the normal visual acuity seen in 97% of all participants. Dry eye, conjunctival changes and retinal pigmentary abnormalities were among these ocular morbidities. This could be due to the existence of a relatively younger study subjects in this study which is similar with other study.2 Subnormal visual acuity (V/A <6/9) was mentioned as a major functional problem among kidney transplant cases in other report.7

The highest number of cases with dry eye 76 (59.4%) in this report could be due to the data collection time (dry season) and place (Ethiopia is one of the tropical country). Data was collected in the driest season of the nation that could predispose patients to manifest with dryness of the eye. Lubricant eye drops and protective eye glass prescription were given for these individuals. As an isolated problem, Pinguicula was seen in 5.5% of the transplant cases in this study which is low compared to other reports.7 This conjunctival degenerative changes often result from prolonged exposure to ultraviolet radiation 4 which could be also the case in this study where almost all of the subjects live in this tropical country with high ultraviolet radiation exposure.

The second most prevalent ocular disorder seen was optic neuropathy, two of the cases were glaucoma suspects and they were linked to the glaucoma services and the rest

were due to other neuropathies. Optic neuropathies were less frequently observed problems in renal transplant patients.

Retinal pigment abnormalities were seen in 6.7% of the study subjects which is a bit lower than the previous reports from both Iran and USA that is 14% 7 and 20% 6 respectively. The cause of these pigmentary changes in the choroid and the retinal pigment epithelium is not known but it might be related to a change in the haemodynamics of the choroid circulation 4 in these groups of patients. It's not wise to consider senile degenerations as an etiologic factor since study subjects in this study were relatively young.

Cataract was observed in 6.2% in this study which is very insignificant when compared to the previous reports.<sup>1,2,7</sup> Specifically posterior-sub capsular cataract was mentioned as one of the commonly seen type of cataract. Different reports put different reason for this, one of the commonest reason being a relationship between steroid treatment and cataracts.<sup>5,13</sup> We did not find any significant relationship between the use of oral steroids and cataracts. This could be due to careful and monitored use of prednisolone and co administration of other safe immunosuppressive agents like cyclosporine and MMF in this setup.

In this study intraocular pressure(IOP) was found to be normal in all the study subjects but there was a report of high IOP among renal transplant subjects in some literatures.<sup>2,14</sup> The high IOP level was related to the amount of systemic corticosteroid therapy.<sup>3</sup>

## CONCLUSION

The cause of the ESRD is known for only 17% of the study subjects that makes it difficult for us to explain the different ocular manifestations in relation to the ESRD. Majority of the subjects (70.4%) were males (70.4%) and are residents of town (94.8%) and this is due to the fact that males and those who live in town have better access to services like medical care than females and those who live in rural areas for obvious reason. Dry eye is the most common eye morbidity detected among kidney transplant patients. The occurrence of sight-threatening ocular complications such as cataract in renal transplant patients is relatively low. Although most ocular problems identified in this study were not related to poor vision, routine ophthalmologic evaluation should be done for early detection, better management and improved quality of life of such patients.

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