Results

Table 1: Demographic Personal data of the recipients and donors:-

	Rejection group (*n*=927)%	**Control group (*n*=858)%**	**p-value**
A-Age of recipients (years),			
Mean (SD)	29.495(10.14)	30.46(10.61)	**0.050**
B-Gender of recipients, n (%)			
Male	704 (75.9)	624 (72.7)	
Female	223(24.1)	234(27.3)	0.129
B-Donor age (years), Mean (SD)	36.08(10.22)	34.60(9.87)	**0.028**
C-Donor Gender, n (%)			
Male	428 (46.2)	430 (50.1)	0.097
Female	499 (53.8)	428(49.9)	
D-Consanguinity			
Related	750(80.9)	719(83.8)	0.121
Unrelated	177(19.1)	139(16.2)	

	Rejection group (*n*=927)%	**Control group (*n*=858)%**	**p-value**
Consanguinity, n (%)			
Parents	267(28.8)	221(25.8)	
Sibling	411(44.3)	441(51.4)	
Off springs	9(1)	20(2.3)	**0.001**
Emotionally related	57(6.1)	55(6.4)	
Other relatives	63(6.8)	37(4.3)	
Unrelated	120(12.9)	84(9.8)	

- *Rejection and control groups were comparable regarding age and sex of recipients. The rejection group was a little younger than control group, with borderline statistical significance (p=0.05).*
- *Donors of rejection group were older than that of control group donors. Percentage of female donors was insignificantly more in rejection group. Sibling donors were the highest percentage in donation in both groups with higher percentage in control group. Percentage of unrelated and emotionally related donors was higher in rejection group.*

Table 2: Haematological factors:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
A-Prior blood transfusion			
No	380(41)	491(57.2)	
Yes	547(59)	367(42.8)	**<0.001**
B-Number of blood transfusion			
No transfusion	380(41)	491(57.2)	
1-2	159(17.2)	139(16.2)	**<0.001**
3-4	167(18)	97(11.3)	
>=5	221(23.8)	131(15.3)	
C-ABO Compatibility			
Same	739(79.7)	691(80.5)	0.678
Different	188(20.3)	167(19.5)	

- *The percentage of blood transfusion in rejection group was significantly higher in rejection group and most patients received blood more than five times. The percentage of same blood group couples is more than different blood group couples but comparable in both groups.*

Table 3: Pre-transplant dialysis:

Pre-transplant dialysis	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
No	25(2.7)	34(4)	
yes	902(97.3)	824(96)	0.146

- *The two groups were comparable regarding pre-transplant dialysis.*

Table 4: Immunological workup:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
A-HLA mismatch			
Zero mismatch	33(3.6)	109(12.7)	
One mismatch	95(10.2)	128(14.9)	
Two mismatch	503(54.3)	436(50.8)	**<0.001**
Three mismatch	174(18.8)	114(13.3)	
Four mismatch	73(7.9)	51(5.9)	
B-DR mismatch			
Zero mismatch	42(4.5)	134(15.6)	
One mismatch	852(92)	711(83)	**<0.001**
Two mismatch	1(0.1)	1(0.1)	

- *The percentage of HLA two mismatch and DR one mismatch was the highest percentage in both groups but significantly higher in rejection group. Zero mismatches were higher in control group. HLA four mismatches and DR two mismatches were higher in the rejection group.*

Table 5: Past medical disorders:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
A-Schistosomiasis			
No	640(69)	628(73.2)	0.053
yes	287(31)	230(26.8)	
B-HCV antibodies (not tested in all patients) (No=790)			
Negative	141(51.8)	294(56.8)	
Positive	131(48.2)	224(43.2)	
C-Original kidney disease			
Chronic pyelonephritis	125(32.9)	124(35.2)	
Glomerulonephritis	106(27.9)	93(26.4)	
Amyloidosis	21(5.5)	10(2.8)	
Autosomal dominant Polycystic kidney	20(5.3)	23(6.5)	0.114
Hypoplasia	9(2.4)	7(2)	
Obstructive uropathy	19(5)	29(8.2)	
Nephrosclerosis	32(8.4)	16(4.5)	
Others	48(12.6)	50(14.2)	
D-Pre-transplant hypertension, n (%):			
No	393(42.4)	335(39)	0.162
Yes	534(57.6)	523(61)	
E-No. of Transplant received			
First	892(96.2)	821(95.7)	
Second	34(3.7)	36(4.2)	0.847
Third	1(0.1)	1(0.1)	

- *The percentage of schistosomial infection in rejection group is higher than control group yet this difference did not rank to statistical significance. The percentage of hepatitis C virus antibodies was insignificantly higher in rejection group than in control group. The percentage of pre-transplant hypertension was insignificantly higher in control group. Chronic pyelonephritis was the commonest original kidney disease of both groups with no significant difference between both groups.*

Table 6: Surgical characteristics:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
A-Ischemia time in minutes M(SD)	44.51(13.42)	46.59(14.76)	**0.002**
B-Ischemia time			
<30	135(14.6)	85(9.9)	
30-60	713(76.9)	656(76.5)	**<0.001**
>60	79(8.5)	117(13.6)	
C-Time to diuresis			
Immediate	824(88.9)	811(94.5)	**<0.001**
Delayed	103(11.1)	47(5.5)	
D-Number of renal arteries			
Single	830(89.5)	762(88.8)	0.648
Multiple	97(10.5)	96(11.2)	

- *Ischemia time was statistically longer in control group. Percentage of immediate diuresis is higher in control group. No statistical difference between both groups in single and multiple arteries.*

Table 7: Number of graft FNAC & biopsies:

	Rejection group (*n*=927)%	Control group (*n*=858)%	P-Value
A) No. of graft FNAC. Median range (minimum,maximum)	1(0, 5)	0(0, 5)	**<0.001**
	Rejection group (*n*=927)%	**Control group (*n*=858)%**	**P-Value**
B)No. of graft biopsies Median range(minimum, maximum)	2(0, 8)	1(0, 6)	**<0.001**

- *There was significant statistical difference in the number of FNACs and biopsies between both groups.*

Table 8: Immunosuppression:

A-Maintenance Primary immunosuppression protocols

	Rejection group (*n*=927)%	**Control group (*n*=858)%**	**p-value**
Type of primary immunosuppression			
AZA. based	243(26.2)	65(7.6)	
CSA based	109(11.8)	64(7.5)	
Triple	497(53.6)	492(57.3)	**<0.001**
FK based	63(6.8)	169(19.7)	
Rapa based	15(1.6)	68(7.9)	

- *Triple immunosuppression had the highest percentage in both groups. AZA and CSA based protocols had a higher percentage in the rejection group. FK and Rapa Based protocols had a higher percentage in the control group.*

B-Total steroid dose in first three months by grams:

	Rejection group (*n*=927)%	**Control group (*n*=858)%**	**p-value**
Total dose of steroid in 1st 3 months M(SD)	7.62(3.35)	3.57(1.52)	**<0.001**
Total dose of steroid by *group*			
<5 grams	223(24.1)	770(89.7)	
5-10 grams	500(53.9)	84(9.8)	**<0.001**
>10 grams	204(22)	4(0.5)	

- *Steroid dose was significantly higher in rejection group.*

Table 9: Diagnosis of rejection:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
1-Clinical／ Laboratory	371(40.021)	201(23.42)	
2-Tissue diagnosis			
A-FNAC (Acute cellular rejection)	84 (9.1)	1(0.1)	
B-Biopsy proven			
Acute vascular	78(8.4)	1(0.1)	
Acute cellular	394(42.5)	87(10.14)	
C-Banff classification			**<0.001**
Border line rejection	89(9.6)	60(7)	
Acute rejection grade I (mild)	63(6.8)	22(2.6)	
Acute rejection grade II (moderate)	39(4.2)	5(0.6)	
Acute rejection grade III (severe)	7(0.8)	0(0)	

- *Acute cellular rejection had the highest percentage in both groups.*
- *Banff classification results showed that border line rejection had the highest percentage in both groups and more in the rejection group.*

Table 10: Management of rejection episodes:

Antirejection treatment	Rejection group (*n*=927)%
Steroids	856(0.92)
ATG	21(2.3)
Mabthera	1(0.1)
Steroids and irradiation	16(1.7)
Plasma exchange and steroids	30(3.2)
Plasma exchange and Mabthera	3(0.3)

- *Steroid therapy had the highest percentage.*

Table 11: Post transplant complications:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
ATN			
No	857(92.4)	835(97.3)	
Yes	70(7.6)	23(2.7)	**<0.001**
Bacterial infection			
No	818(88.3)	758(88.3)	
Yes	108(11.7)	100(11.7)	1.000
Medical infection			
No	658(71)	697(81.2)	**<0.001**
Yes	269(29)	161(18.8)	
Hepatic problems			
No	854(92.1)	798(93)	0.528
Yes	73(7.9)	60(7)	
Viral infection			
No	845(91.2)	790(92.1)	0.496
Yes	82(8.8)	68(7.9)	
Hypertension early post-transplantation			
No	276(29.8)	323(37.6)	
Yes	651(70.2)	535(62.4)	**<0.001**
HTN post transplantation			
No	248(26.8)	353(41.1)	**<0.001**
Yes	679(73.2)	505(58.9)	
Diabetes Mellitus early post-transplantation			
No	844(91)	798(93)	
Yes	83(9)	60(7)	0.138
DM, ,post transplantation			
No	732(79)	659(76.8)	0.278
Yes	195(21)	199(23.2)	

Renal artery stenosis			
No	922(99.5)	855(99.7)	0.728
Yes	5(0.5)	3(0.3)	
Renal artery thrombosis			
No	923(99.6)	847(98.7)	0.067
Yes	4(0.4)	11(1.3)	
Renal vein thrombosis			
No	926(99.9)	856(99.8)	0.611
Yes	1(0.1)	2(0.2)	
Surgical infection			
No	918(99)	853(99.4)	0.427
Yes	9(1)	5(0.6)	
Hematoma			
No	921(99.4)	857(99.9)	0.126
Yes	6(0.6)	1(0.1)	
Chronic rejection			
No	634 (68.4)	748(87.2)	
Yes	293(31.6)	110(12.8)	**<0.001**
Malignancy			
No	870(93.9)	815(95)	
Yes	57(6.1)	43(5)	0.305

- *ATN, Medical infection, HTN post transplantation percentages were higher in the rejection group.*
- *Chronic rejection was significantly higher in the rejection group.*
- *Bacterial infection, Hepatic problems, viral infections, DM incidence post-transplantation, surgical complications (as renal artery stenosis thrombosis, renal vein thrombosis, hematoma& surgical infection) and Malignancy incidence were comparable in both groups.*

Table 12: Clinical grading:

A-At one year by group:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
Cr.<1.5 mg⁄dl	475(51.2)	679(79.1)	
Cr. 1.5 to 3 mg⁄dl	312(33.7)	137(16)	
Cr. 3 to 5 mg⁄dl	19(2)	5(0.6)	
Cr. > 5 , no dialysis	7(0.8)	1(0.1)	
Graft failure	14(1.5)	5(0.6)	
			<0.001
Immunologic rejection	40(4.3)	2(0.2)	
Died with functioning graft	25(2.7)	9(1)	
Recurring original	0(0%)	1(0.1)	
Technical failure	0(0%)	5(0.6)	

B-Clinical grading at two years by group:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
Cr.<1.5 mg⁄dl	382(41.2)	604(70.4)	
Cr. 1.5 to 3 mg⁄dl	319(34.4)	173(20.2)	
Cr. 3 to 5 mg⁄dl	55(5.9)	19(2.2)	
Cr. > 5, no dialysis	11(1.2)	1(0.1)	**<0.001**
Graft failure	5(0.5)	4(0.5)	
Immunologic rejection	21(2.3)	2(0.2)	
Died with functioning graft	5(0.5)	5(0.6)	

C-Clinical grading at three years by gro

up:

	Rejection group (*n*=927)	Control group (*n*=858)	p-value
Cr.<1.5 mg⁄dl	325(35.1)	545(63.5)	
Cr. 1.5 to 3 mg⁄dl	328(35.4)	201(23.4)	
Cr. 3 to 5 mg⁄dl	55(5.9)	25(2.9)	
Cr. > 5, no dialysis	16(1.7)	7(0.8)	**<0.001**
Graft failure	7(0.8)	3(0.3)	
Immunologic rejection	15(1.6)	6(0.7)	
Died with functioning graft	6(0.6)	2(0.2)	
Recurring original kidney disease	1(0.1)	0(0%)	

D-Clinical grading at four years by group:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
Cr.<1.5 mg⁄dl	294(31.7)	498(58)	
Cr. 1.5 to 3 mg⁄dl	299(32.3)	220(25.6)	
Cr. 3 to 5 mg⁄dl	65(7)	17(2)	
Cr. > 5, no dialysis	12(1.3)	7(0.8)	**<0.001**
Graft failure	10(1.1)	5(0.6)	
Immunologic rejection	19(2)	7(0.8)	
Died with functioning graft	5(0.5)	2(0.2)	
Recurring original disease	0(0)	1(0.1)	

E-Clinical grading at five years by group:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
Cr.<1.5 mg⁄dl	268(28.9)	476(55.5)	
Cr. 1.5 to 3 mg⁄dl	281(30.3)	211(24.6)	
Cr. 3 to 5 mg⁄dl	50(5.4)	23(2.7)	
Cr. > 5, no dialysis	24(2.6)	4(0.5)	
Graft failure	9(1)	9(1)	**<0.001**
Immunologic rejection	22(2.4)	2(0.2)	
Died with functioning graft	6(0.6)	6(0.7)	
Recurring original disease	1(0.1)	0(0)	

- *The percentage of Patients with serum creatinine less than 1.5mg/dl was higher in the control group through the five years post-transplantation, graft impairment>1.5mg/dl and failed graft through the first five years had occurred more in the rejection group.*

Table 13: Condition at last follow up:

	Rejection group (*n*=927)%	Control group (*n*=858)%	P-Value
Living with functioning graft	281(30.3)	506(59)	
Living on dialysis	325(35.1)	180(21)	
Died with functioning graft	153(16.5)	101(11.8)	**<0.001**
Died with failed graft	145(15.6)	38(4.4)	
Referred	23(2.5)	33(3.8)	

- *Living patients with functioning graft patients were higher in the control group whereas death and failed graft were higher in the rejection group*

Table 14: Direct cause of death:

A- Direct cause of death with functioning graft:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
Cardiovascular	27(2.9)	21(2.4)	
Respiratory	20(2.2)	8(0.9)	
GIT	7(0.8)	2(0.2)	
Liver cell failure	9(1)	12(1.4)	
Cerebral	7(0.8)	10(1.2)	
Infection	16(1.7)	7(0.8)	**0.007**
Bleeding	2(0.2)	2(0.2)	
Trauma	0(0)	1(0.1)	
Tumor	14(1.5)	13(1.5)	
Other specify	0(0)	1(0.1)	
Unknown	55(5.9)	23(2.7)	
Inapplicable	770(83.1)	758(88.3)	

B-Direct cause of death with failed graft:

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
Cardiovascular	40(4.3)	7(0.8)	
Respiratory	18(1.9)	5(0.6)	
GIT	2(0.2)	1(0.1)	
Liver cell failure	12(1.3)	8(0.9)	
Cerebral	2(0.2)	0(0)	
Infection	10(1.1)	3(0.3)	**<0.001**
Bleeding	0(0)	2(0.2)	
Tumor	6(0.6)	2(0.2)	
Other specify	0(0)	1(0.1)	
Unknown	51(5.7)	9(1.05)	

- *Cardiovascular, respiratory, infection and GIT causes were higher in the rejection group.*

Table 15: Serum creatinine M(SD):

	Rejection group (*n*=927)%	Control group (*n*=858)%	p-value
After one year	1.56(0.74)	1.26(0.60)	**<0.001**
After two years	1.75(0.93)	1.38(0.70)	**<0.001**
After three years	1.87(1.09)	1.46(0.74)	**<0.001**
After four years	1.94(1.21)	1.48(0.85)	**<0.001**
After five years	1.98(1.23)	1.49(0.75)	**<0.001**
At last follow up	2.70(2.38)	2.19(2.21)	**0.001**

- *The average serum creatinine was lower in control group than its average in rejection group through the five years post-transplantation*

Table 16: Creatinine clearance last follow up M(SD):

	Rejection group (*n*=927)	Control group (*n*=858)	p-value
Creatinine clearance M(SD)	48.30(29.26)	59.79(29.86)	**<0.001**

- *Creatinine clearance in the control group was higher than rejection group.*