

# Excellent Short-term Outcomes of ABO-incompatible Living Donor Kidney Transplantation

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## Background

ABO incompatible kidney transplantation (ABOi KT) is one of efforts to solve the problem of organ shortage in transplantation. Recently, our center launched the program of ABO incompatible kidney transplant. Herein, we report our excellent short-term outcome of ABO incompatible living donor kidney transplantation.

## Materials & Methods

**Aims :** To evaluate the graft and patient outcome of ABO incompatible living kidney transplant

Baseline data for ABO incompatible or ABO compatible kidney transplant in SNUH

- 687 KT population (2006.1.1 – 2012.12.31)
- ABOi kidney transplant (n= 27)
- ABO compatible (ABOc) living kidney transplant (n= 360)
- ABOc deceased kidney transplant (n= 299)

Maximal follow up duration of 7 years for overall kidney transplant recipients  
 Maximal follow up duration of 3 years for ABO incompatible kidney transplant recipients  
 Description of patients profile  
 Description of desensitization protocol & actually delivered management  
 Description of patient survival & graft survival / Comparison of patient survival & graft survival  
 Description of adverse events related to transplant or desensitization process

## Results

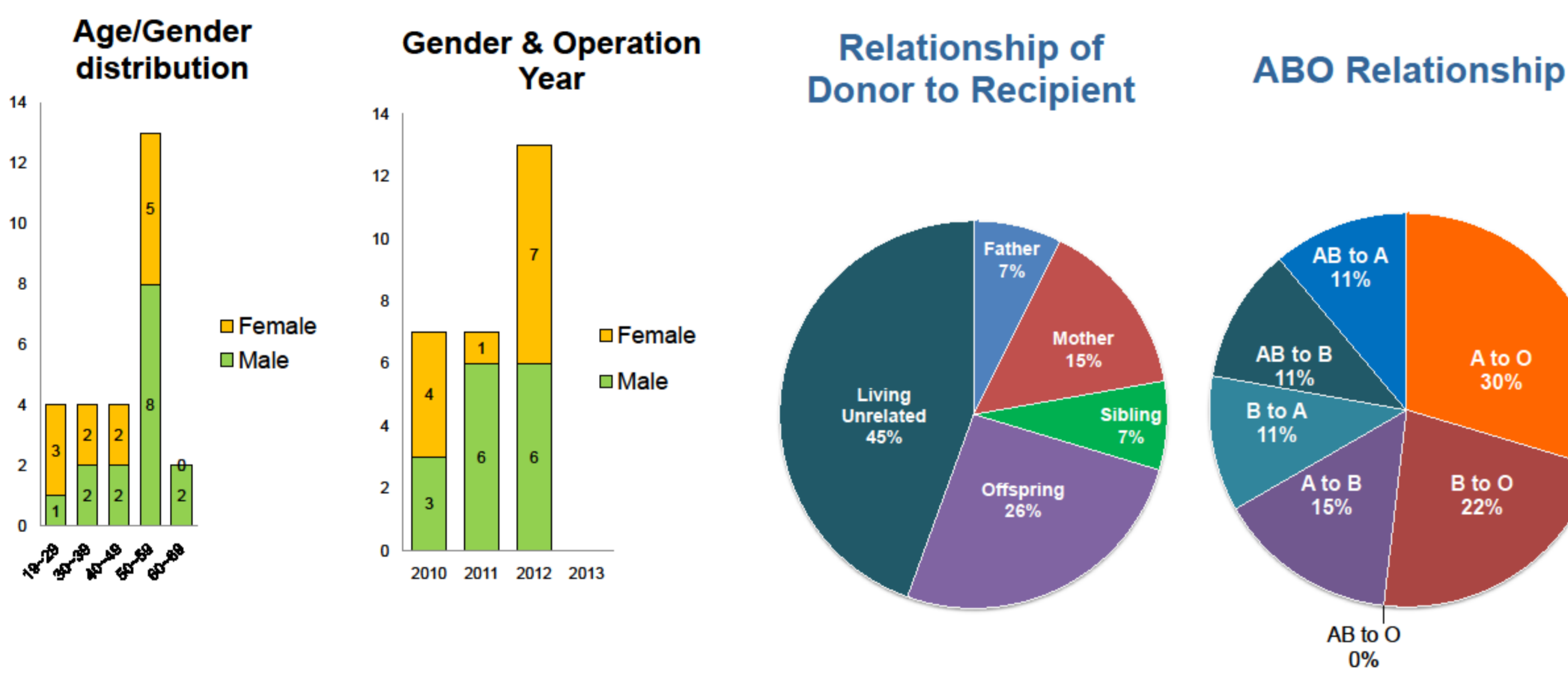
### Clinical Characteristics and Immunologic Profile

#### Clinical Characteristics

#### Immunologic Profile of ABOi KT

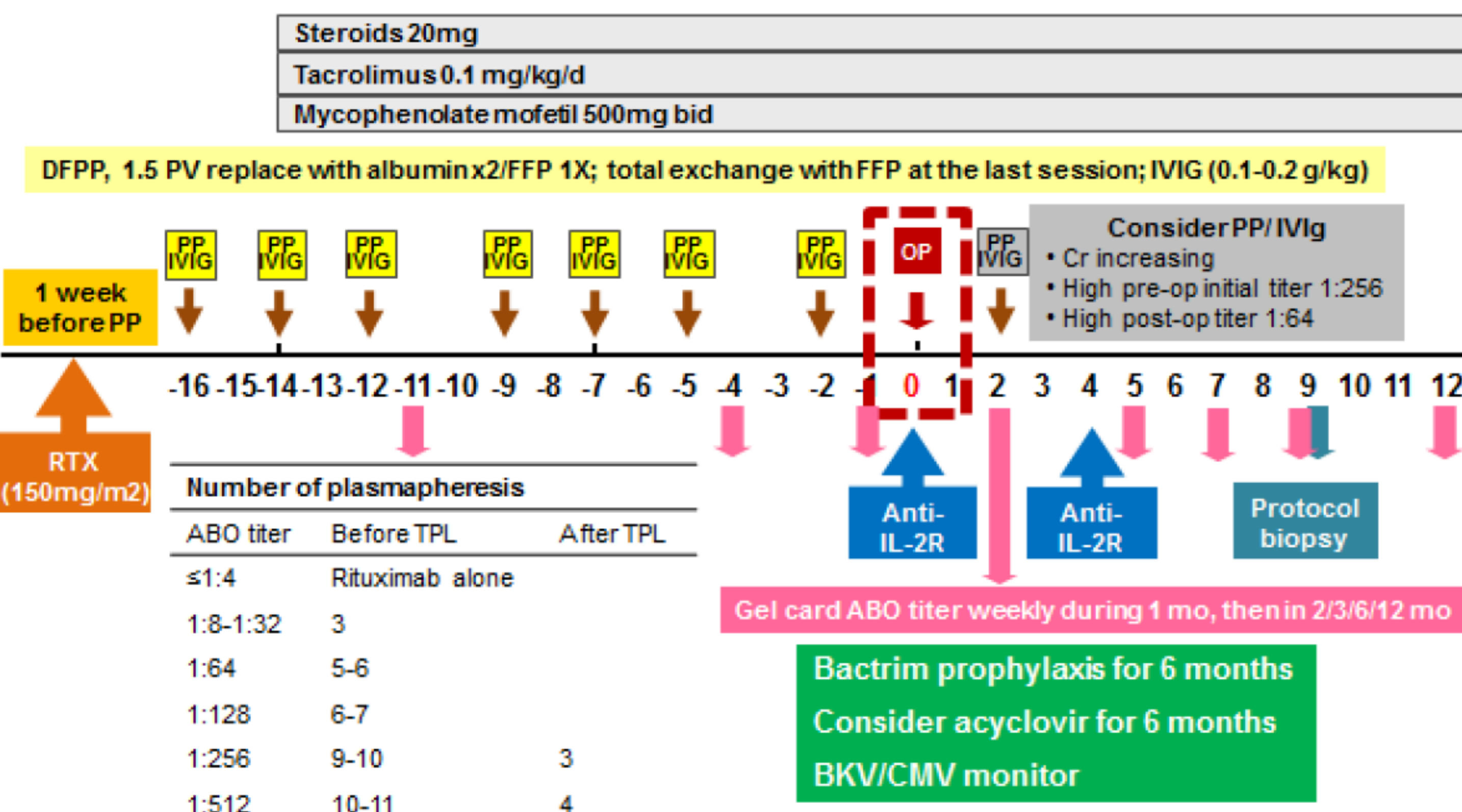
	N (%) or Median ± IQR (Range)		P-value	N (%) or Mean ± S.D.		P-value
	ABO compatible (n=660)	ABO incompatible (n=27)		ABO compatible (n=660)	ABO incompatible (n=27)	
Male	396 (60.0)	15 (55.6)	0.644			
Age at Transplantation	46.6 ± 19.1 (18.3 – 70.6)	50.3 ± 22.2 (19.3 – 63.8)	0.578	Number of HLA mismatches	3 ± 2 (0 - 6)	3 ± 2 (1 - 5)
Cause of ESRD			0.364	Donor specific antibody	29 (4.4)	0 (0)
DM	122 (18.5)	8 (29.6)		PRA class I (+)	113 (21.0)	2 (7.4)
HTN	50 (7.6)	0 (0)		Mean PRA class I panel percentage	9.4 ± 24.0	3.3 ± 11.8
GN	245 (37.1)	8 (29.6)		PRA class II (+)	94 (17.3)	2 (7.4%)
PKDs	49 (7.4)	3 (11.1)		Mean PRA class II panel percentage	6.2 ± 18.3	3.93 ± 38.55
Others	53 (8.0)	3 (11.1)		CDC T XM +	1 (0.2)	0 (0)
Unknown	141 (21.4)	5 (18.5)		FCXM T XM +	10 (1.5)	1 (3.7)
				FCXM B XM +	6 (1.2)	1 (3.7)

### Age, Operation vintage and Relationship distribution

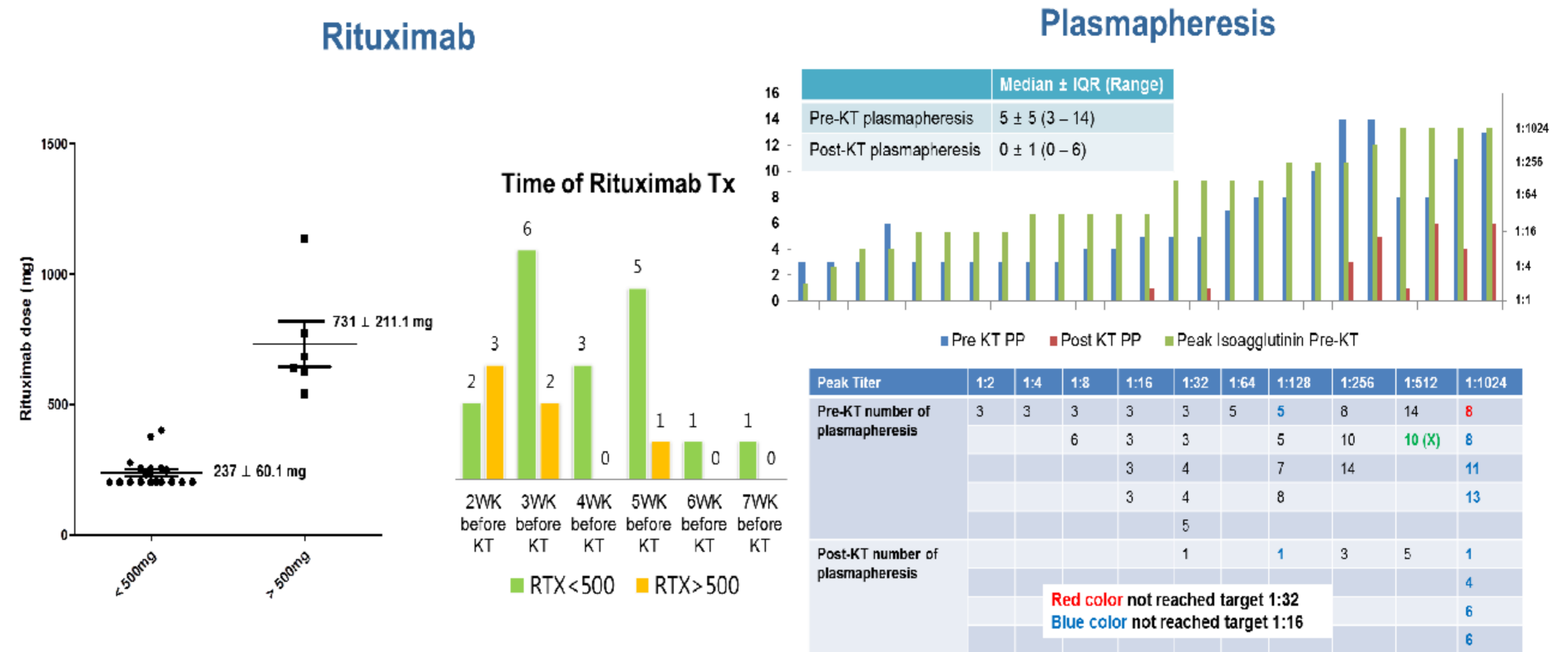


### SNUH Protocol for ABOi KT

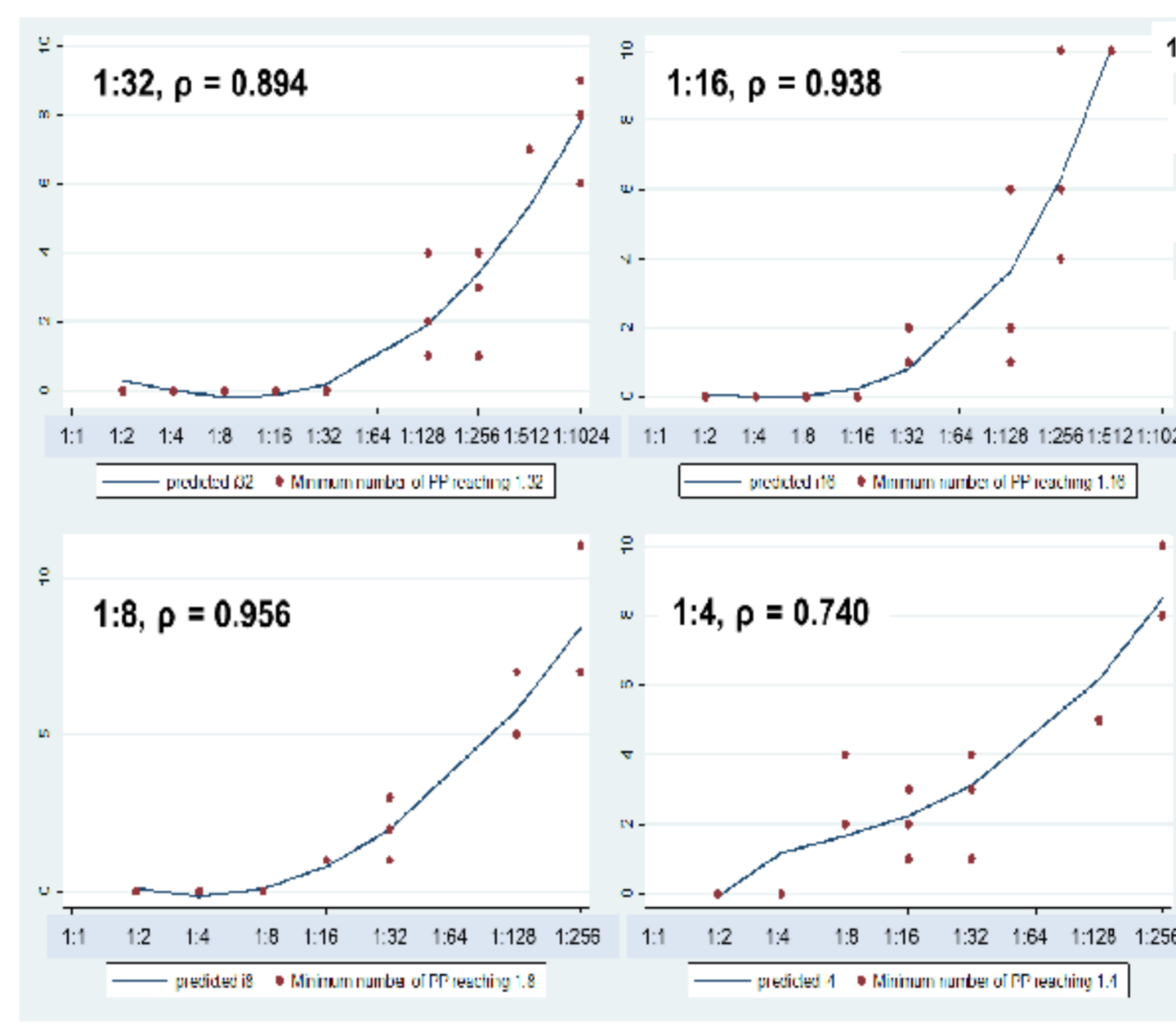
Acceptable initial isoagglutinin titer ≤ 1:512, acceptable final titer ≤ 1:16  
 Acceptable post-operative isoagglutinin titer ≤ 1:32 by D21



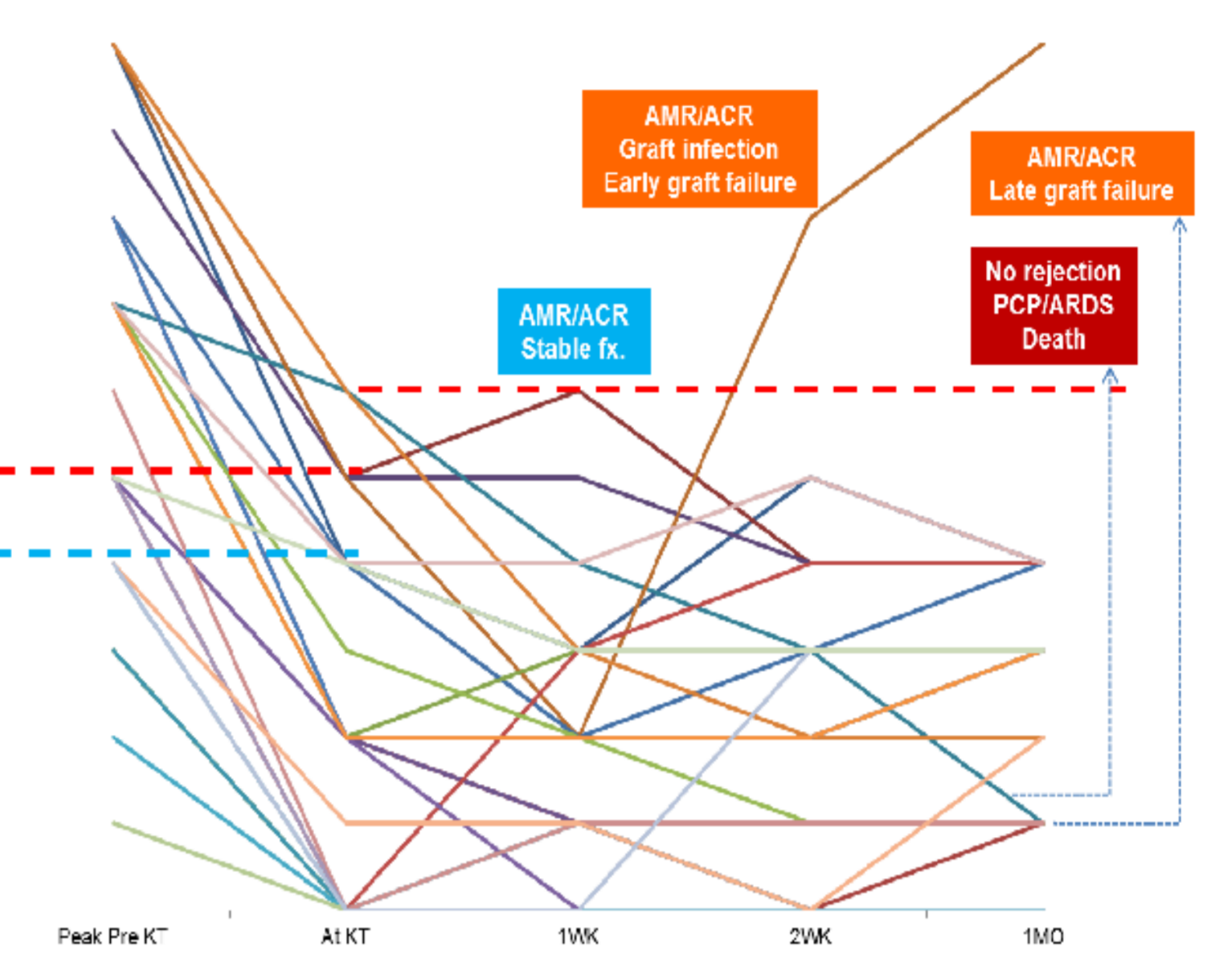
### Description of Actually Performed Desensitization



### Number of Plasmapheresis for Reaching Target Isoagglutinin Level

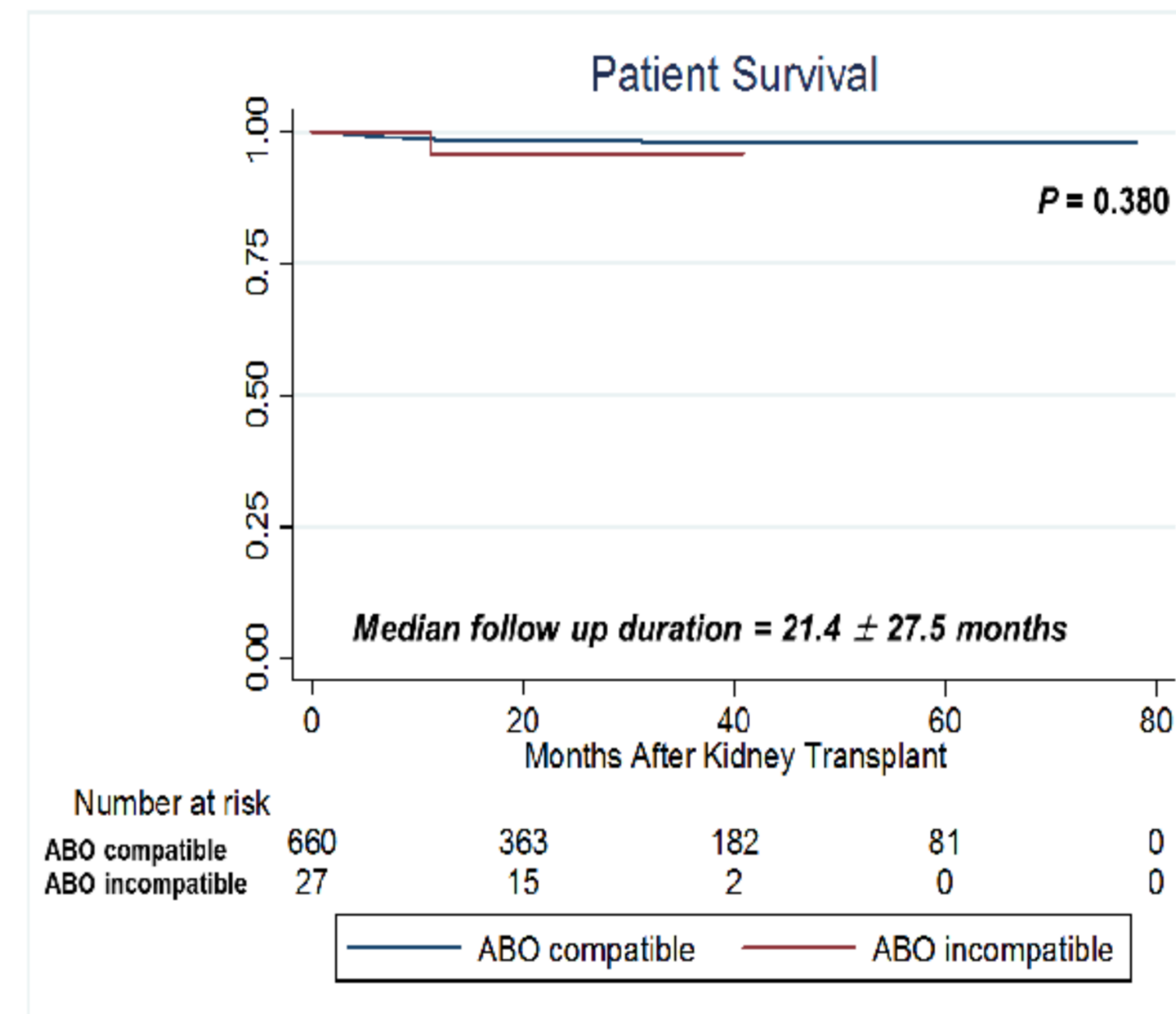


### Changes of Anti-ABO Titer Before & After KT

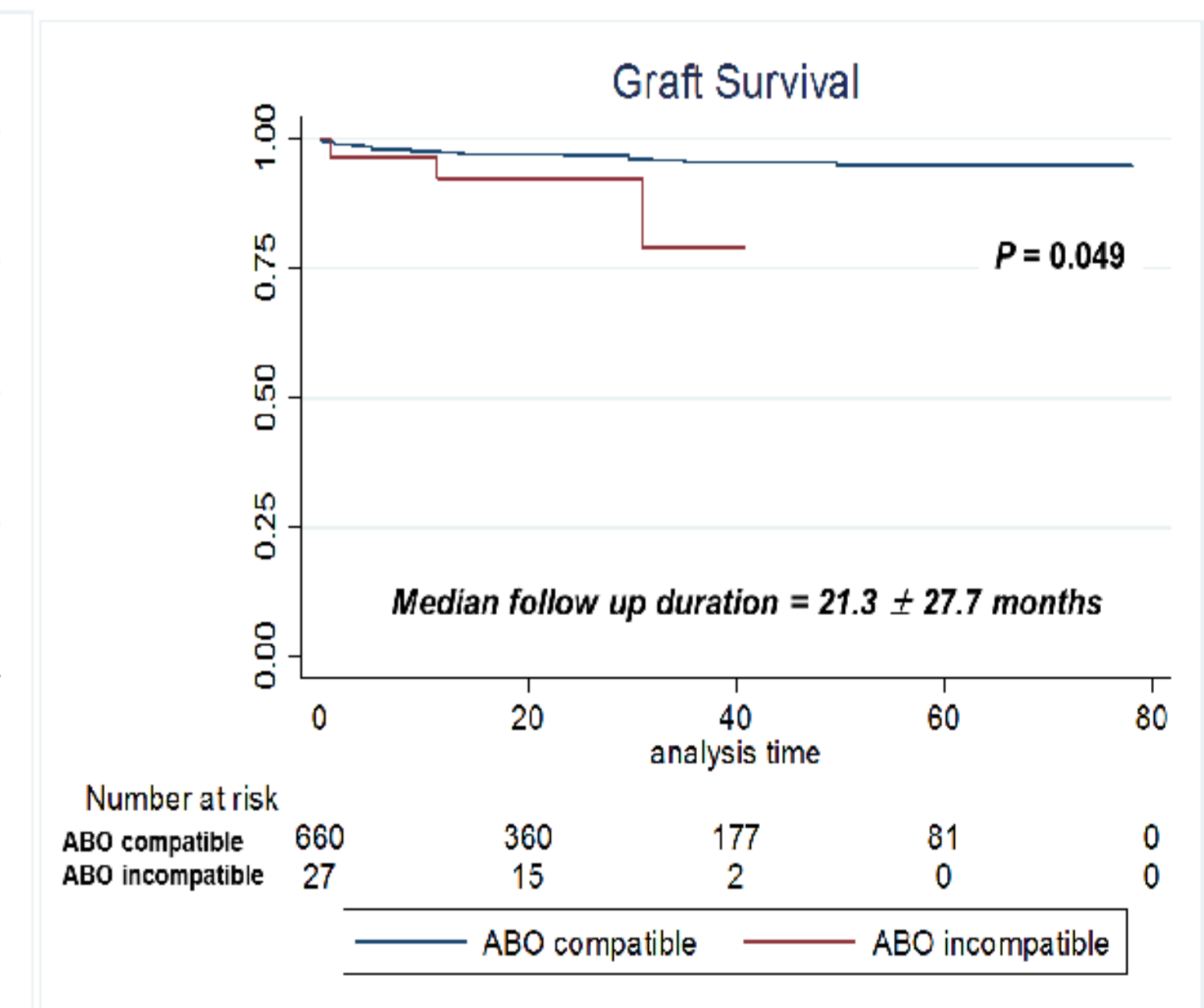


### Outcomes of ABOi Kidney Transplant

#### Patient Survival ABOi vs. ABOc KT



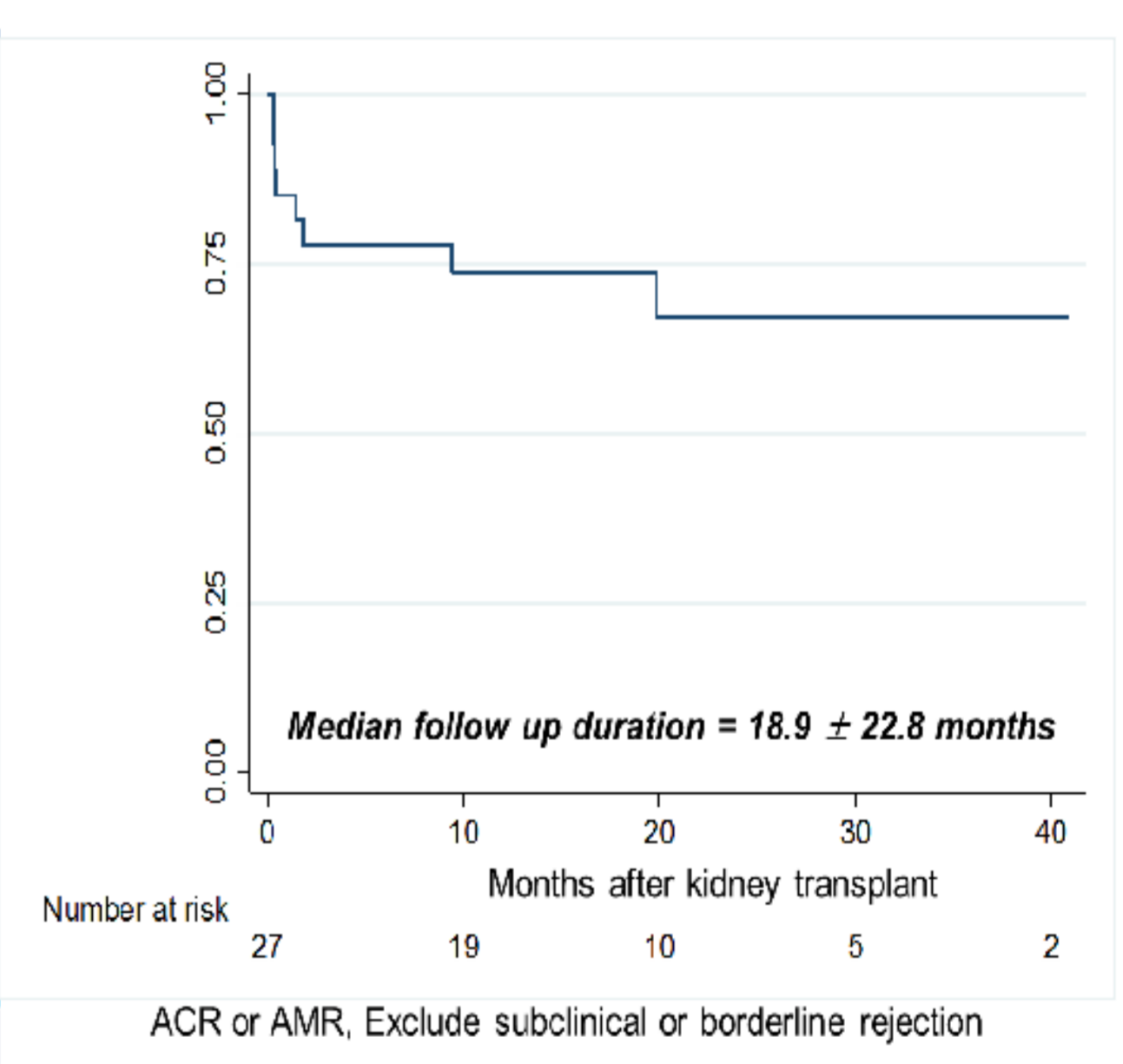
#### Graft Survival ABOi vs. ABOc KT



#### Acute Rejection

	Day 8 protocol biopsy (n=24)		1 year protocol biopsy (n=15)		For cause biopsy (n=7)		Total number of patients (n=27)	
	Sole TMR	With AHR	Sole TMR	With AHR	Sole TMR	With AHR	Sole TMR	With AHR
Clinical rejection (26.3%)							2 (7.4%)	5 (18.5%)
Borderline	2	1	1	0	3	0	3	1
Banff IA	0	1	1	0	0	3	1	3
Banff IB	0	0	1	1	0	1	1	1
Banff II	0	1	0	0	0	0	0	1
AHR alone	0	1	0	0	0	0	0	1
Subclinical rejection (11.1%)							1 (3.7%)	2 (7.4%)
Borderline	3	2	2	0			2	2
Banff IA	0	0	0	0			0	1
Banff IB	0	0	1	0			1	0
AHR alone	1	0	0	0			1	1
No evidence of rejection with C4d deposit	12	3					5	
No evidence of rejection without C4d deposit	2	5					1	
Total	17	7	14	1	3	4	14	11

#### Rejection-Free Survival



### Predictors to Acute Antibody-Mediated Rejection

Variables	Odds Ratio	95% C.I.	P-value
Age	0.987	0.921 – 1.058	0.719
Female gender	1.625	0.262 – 10.096	0.602
HLA mismatch	0.835	0.376 – 1.852	0.658
Rituximab dose	0.997	0.992 – 1.003	0.366
Rituximab > 500mg	0.520	0.048 – 5.629	0.591
Pre-KT peak isoagglutinin	1.266	0.855 – 1.875	0.238
Isoagglutinin at KT	1.272	0.818 – 1.979	0.285
Isoagglutinin at 1 week	1.531	0.851 – 2.752	0.155
Isoagglutinin at 2 week	1.360	0.865 – 2.138	0.183
Isoagglutinin at 1 month	1.515	0.892 – 2.571	0.124
Pre-KT Number of plasmapheresis	1.234	0.955 – 1.593	0.107
Post-KT number of plasmapheresis	1.559	0.989 – 2.457	0.056

AMR, Exclude subclinical rejection

### Complications

	No.	Onset	Detail	Outcome
Myocardial infarction	1	3 months	Detected at Pre-KT screening, Pre-scheduled PCI	Successful PCI
Bleeding	2	8 Days, 7 Days	Upper pole, wound hematoma, Perihilar bleeding at USG	Hematoma evacuation, Ceased with close observation
NODAT	3	2 weeks, 3 weeks, 5 weeks		On oral medication, Transient medication, On insulin therapy
Bacterial infection	2	4, 18 months, 4 weeks	Recurrent UTI due to HB, Pneumonia + Graft infection	Recurrent infection, Pneumonia improved, Graftectomy cone
Pneumocystis infection	1	11 months	Led to ARDS	Mortality occurred
Virus infection	4	2 months, 4 months, 17 months, 7 months	R/O mycoplasma pneumoniae, H. zoster, H. zoster, CMV esophagitis	All Cured

## Summary

- SNUH Policy in ABOi KT
- ABOi KT for blood type O recipients or blood type AB donors without delay
- Try donor-exchange program for at least 6 months for A/B couples
- Desensitization protocols in ABOi KT in SNUH
- Pre-KT Low dose rituximab, plasmapheresis with low-dose IVIG
- (PRN) Post-KT Plasmapheresis with low-dose IVIG, (PRN) splenectomy
- Target Pre-KT peak titer (1:32 → 1:16), post-KT titer (<1:64)
- Bactrim, (PRN) acyclovir
- Outcomes of 27 patients at median 19 months F/U
- AR 25.9%, AMR 18.5%, infectious complications 22.2%
- Patients survival comparable to that of ABOc KT
- Slightly lower graft survival compared with ABOc KT