

Durability of Hepatitis B Seroprotection in Pediatric Renal Transplant Recipients

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Abstract

Background: Hepatitis B virus (HBV) is known to cause hepatic failure and hepatocellular carcinoma; however since vaccination availability, the incidence of HBV has significantly decreased. Despite adequate vaccination, studies in adult renal transplant recipients show a higher loss of HBV titers post-transplant compared to that of the general population.
Methods: Retrospective data were collected to determine the durability of hepatitis B vaccination in pediatric renal transplant patients between October 1, 2004 to October 1, 2014. One hundred and two subjects (61% male) were categorized based on pre-transplant hepatitis B surface antibody (HBsAb).
Results: Pre-transplant, eighty-seven recipients (85%) had a positive HBsAb compared to fifteen (15%) with negative HBsAb. In univariable analyses, no significant differences existed pre-transplant by gender, body mass index (BMI), donor-type, pre-transplantation dialysis, or dialysis length (p <0.05). Of the eighty-seven pre-transplantation responders, fifty-three (61%) remained HBsAb positive post-transplantation, twenty-eight (32%) seroreverted to HBsAb negative, four developed indeterminate titers, and two did not have post-transplantation titers. In univariable analyses, a cadaveric donor type appeared protective for maintenance of HBsAb post-transplantation (p-value=0.005). No significant differences were found in gender, BMI, race, pre-transplantation dialysis, dialysis length, transplant type, HBV vaccination number, or transplantation rejection episodes (p<0.05). Further analysis revealed that all seroreversions occurred within 5 years post-transplant.
Conclusion: At the conclusion of the study period, 32% of the renal transplant recipients lost their HBV seroprotection. Therefore a moderate number of pediatric renal transplant recipients may be at risk for HBV infection. Multivariable analysis is in process to further evaluate durability of HBsAb post-transplant and post-immunization.

Background

- Hepatitis B virus (HBV) infection prevalence in the US is 4.9%, prevalence of chronic infection 0.4%
- Solid-organ transplant recipients may have a more rapid and severe progression of HBV
- Studies in adult renal transplant recipients show an increase loss of the HBV titers compared to the general population
- No studies have been done in pediatric populations.

Aims

1. Determine rate of seroprotection prior to pediatric kidney transplantation.
2. Assess the durability of the hepatitis B vaccination seroprotection over a minimum of 12 months post-transplantation.

Methods

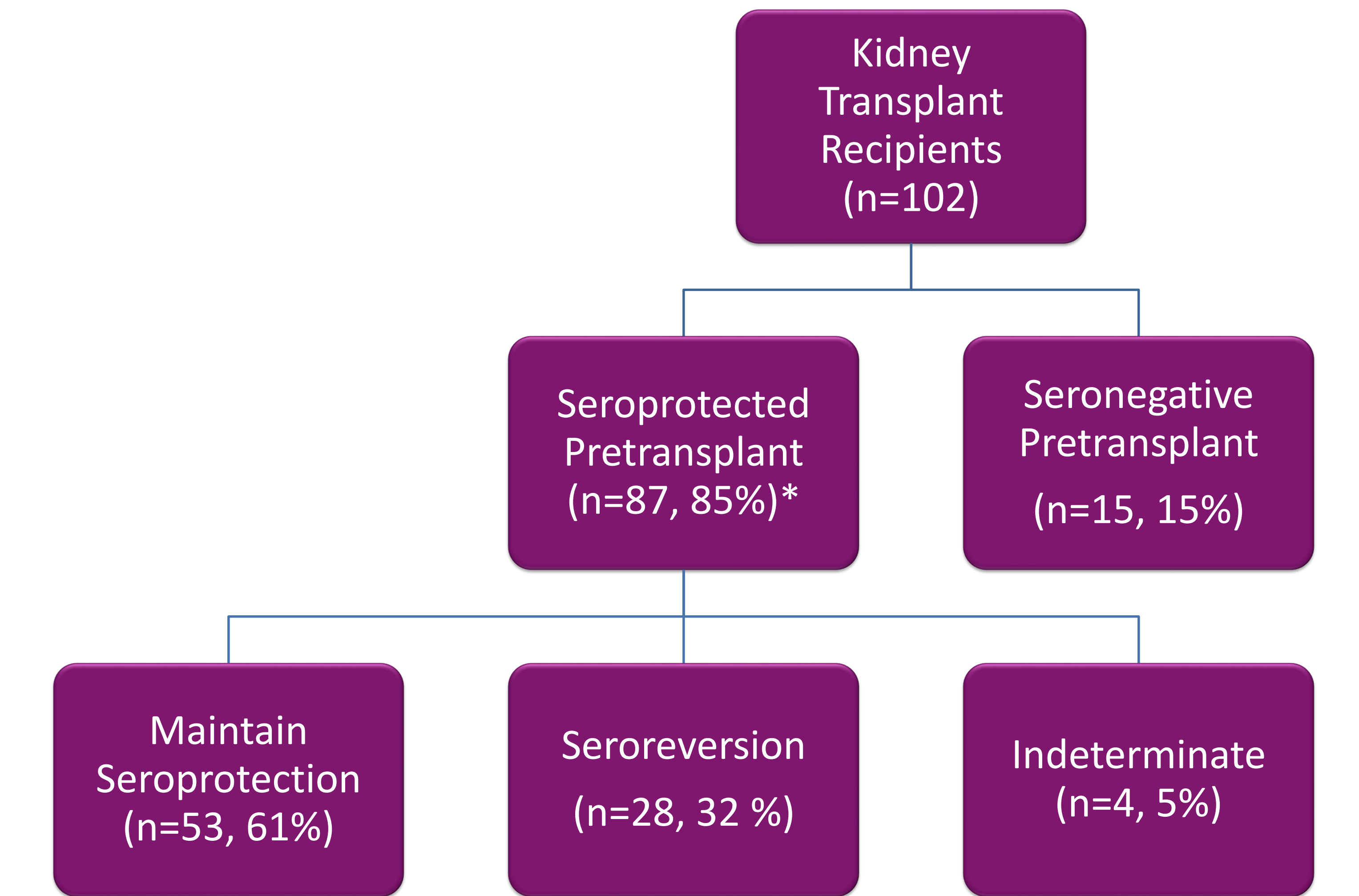
- Retrospective data was collected in pediatric renal transplant patients between October 1, 2004 to October 1, 2014.
- 102 renal transplant recipients were assessed for seroprotection pre-transplant and maintenance of seroprotection post-transplantation.
- Univariable analysis to assess risks for seroprotection and seroreversion were performed with Chi square and T-tests using JMP Pro version 12.1.0, Cary, NC.

Demographics: Pre-Transplantation

		Seroprotected (n=87)	Seronegative (n=15)	p-value
Sex	Male	54	8	0.52
Age	Years Mean (IQR)	11.5 (10.0-12.9)	14.8 (12.0-17.5)	0.02*
Donor Type	Live	55	7	0.23
	Cadaver	32	8	
Race	Caucasian	67	11	0.70
	Non-caucasian	19	4	
Pre-transplant Dialysis	No	22	4	0.92
Dialysis Type	Hemodialysis	23	7	0.17
	Peritoneal Dialysis	33	4	
	Both	9	0	
Length of Dialysis	Months Mean (IQR)	14.6 (11.5-17.7)	15.6 (8.4-22.8)	0.39
Number of vaccinations	Mean (Range)	3.7 (2-8)	3.3 (2-8)	0.30

❖ When comparing patients who originally responded to vaccination the only significant difference was age at time of transplant.

Results – Seroconversion and Seroprotection



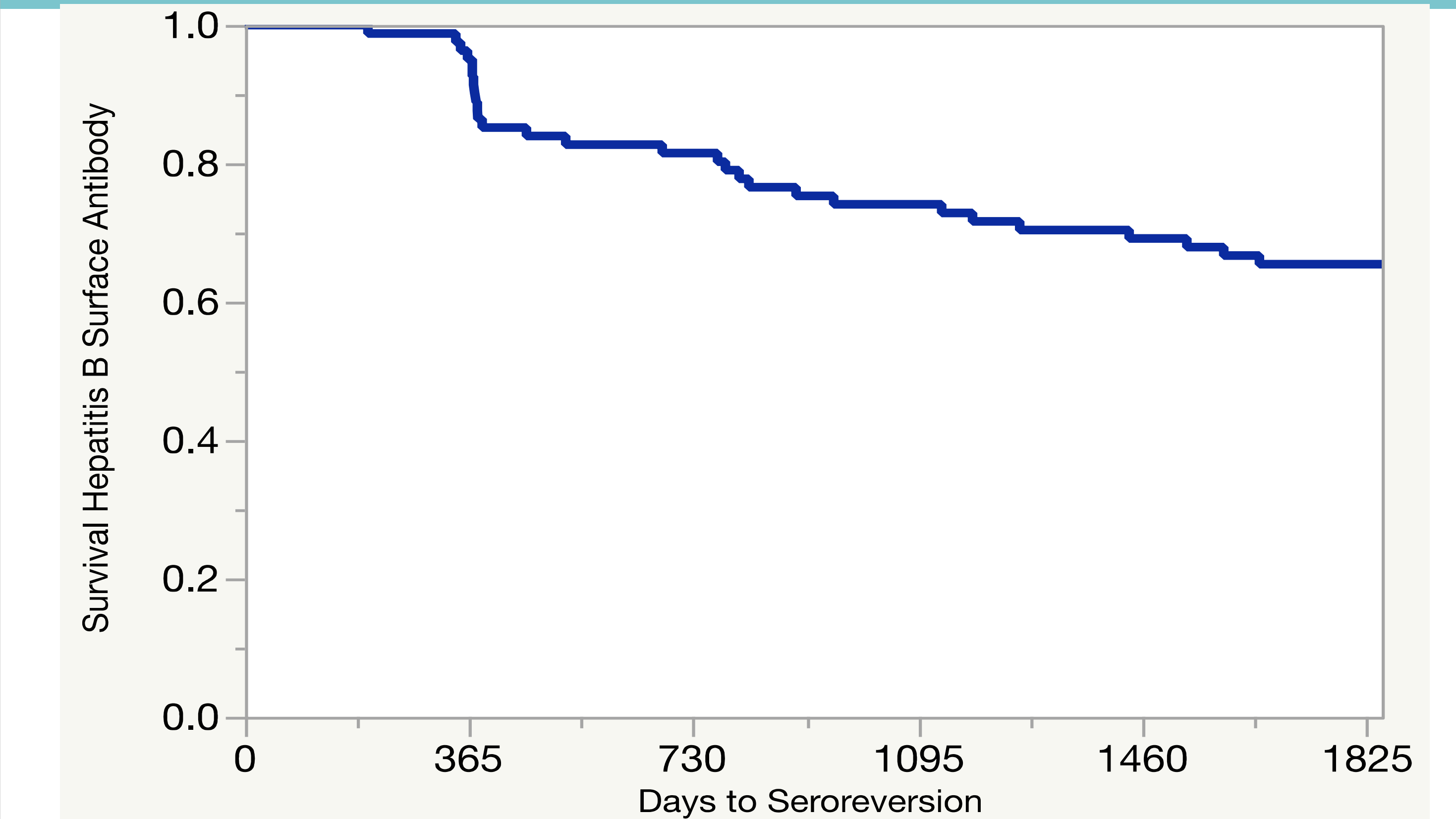
❖ Two were excluded at this point given no post-transplant hepatitis B surface antibodies.

Results – Demographics Post-Transplantation

		Maintain Seroprotection (n=53)	Seroreversion (n=28)	P-value
Sex	Male	36	15	0.20
Age	Years Mean (IQR)	11.9 (10.2-12.6)	9.8 (6.8-12.8)	0.89
Donor Type	Live	29	24	0.005
	Cadaver	24	4	
Race	Caucasian	40	22	0.86
	Non-caucasian	12	6	
Pretransplant dialysis	No	14	7	0.85
Dialysis Type	Hemodialysis	12	8	0.24
	Peritoneal Dialysis	22	8	
	Both	4	5	
Length of Dialysis	Months Mean (IQR)	15.4 (11.4-19.4)	15 (11.3-18.8)	0.55
Number of Vaccinations	Mean (Range)	3.6 (2-8)	3.8 (2-8)	0.72
Number of rejections	Mean (IQR)	1.11 (0.8-1.5)	0.67 (0.2-1.1)	0.07

❖ Live donor type appears to be a risk factor for seroreversion
 ❖ No other significant risk factors distinguished recipients who are at risk of seroreversion including induction agent, CMV DNAemia, EBV DNAemia, CMV donor status and CMV recipients status.

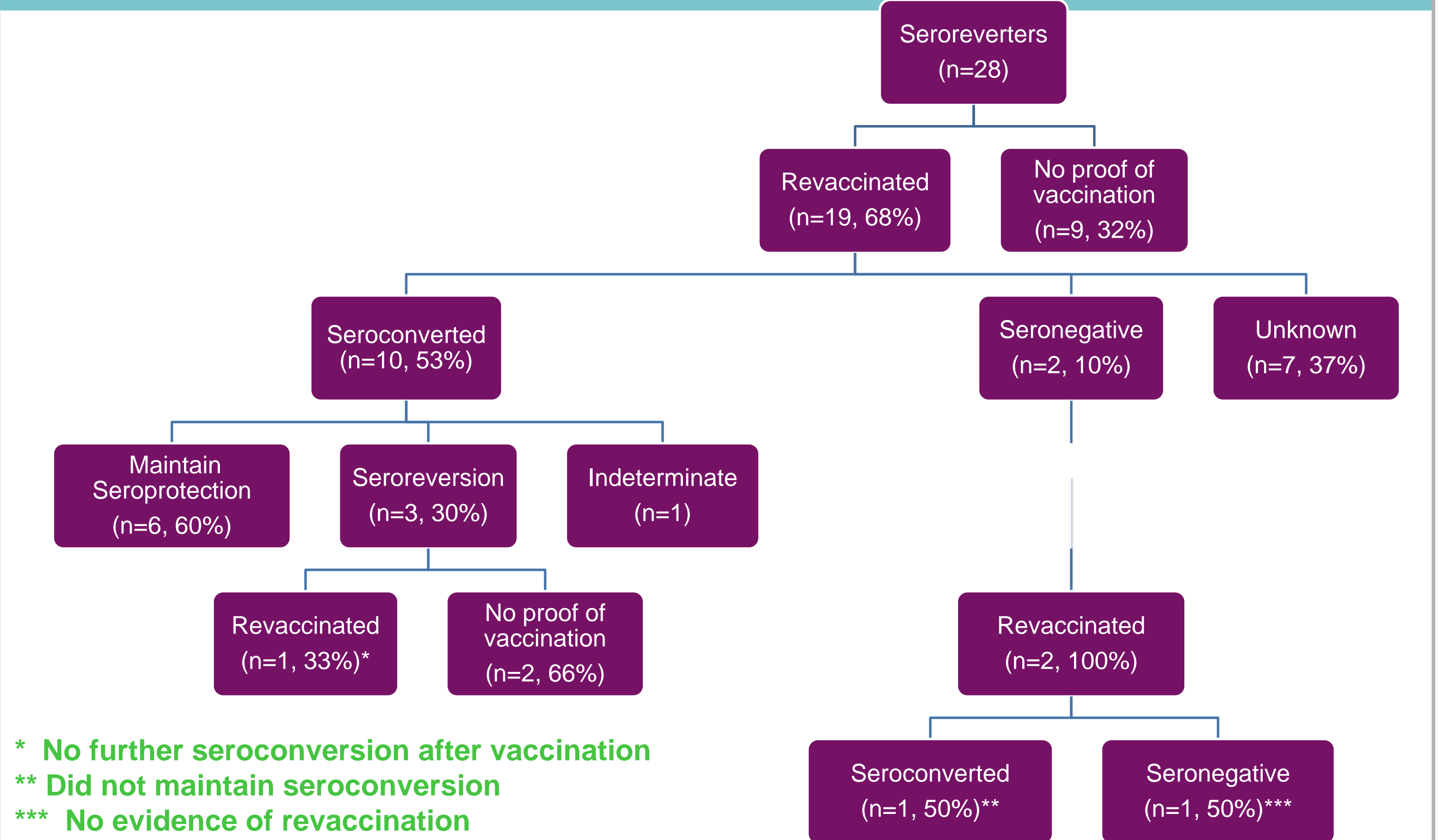
Results – Time to Seroreversion of Hepatitis B Surface Antibody



Years	0	1	2	3	4	5
+	53	53	44	32	27	16
-	28	24	13	7	3	0
Total	81	77	57	39	30	16

❖ 61% of pediatric renal transplant recipients maintained seroprotection

Results: Seroreverters Revaccinations



* No further seroconversion after vaccination
 ** Did not maintain seroconversion
 *** No evidence of revaccination

Conclusions

- 15% of pediatric renal transplant candidates never attain HBV seroprotection despite adequate vaccination
 - Younger age more likely to attain HBV seroprotection.
- 32% of pediatric transplant recipients seroreverted.
 - All seroreversions were found within the first 5 years post-transplantation
 - Live donor type appears to be a risk for seroreversion.
- 68% of seroreverters were revaccinated
 - 53% of those patients seroconverted after revaccination