

Long Term Response of Pediatric Hemodialysis Patients to Hepatitis B Vaccination

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ABSTRACT

Background/Aim: Children on hemodialysis are at a high risk of HBV and/or HBV infection-related chronic liver disease. HBV immunization is protective in healthy children, yet remains unsettled in those on hemodialysis. Following hepatitis B vaccination, lower seroconversion rate, lower peak antibody titer and rapid decline in antibody levels are common among patients on dialysis. This study determines the immune status and response to HBV vaccination among pediatric hemodialysis patients following two different schedules. **Methodology:** One year prospective study for all children on hemodialysis with HBsAb titre <100 IU/L in a single center (n=37; median age: 14 years; M:F 23:14). Patients were assigned randomly into two groups (group 1 and 2). Group 1 received HBV recombinant intramuscular vaccine in 0,1 and 2 months schedule and group 2 received in 0,1 and 6 months schedule. All were tested for HBsAb titre by ELISA, liver transaminases and iron profile at one, six and twelve months following the last dose in both groups. **Results:** all children had HBsAb titre >100IU/L both after one, six and twelve months following last vaccination dose in both groups, with no significant difference between both schedules. **Conclusion:** Hemodialysis children are adequately protected against HBV infection in a one year follow up of HBV vaccination at 0, 1 and 2 months and 0, 1 and 6 months schedule with a similar seroprotection rate.

BACKGROUND

Hemodialysis patients are at an increased risk of acquiring hepatitis B virus (HBV) infection. Hepatitis B virus infection is a global public health problem. It is estimated that there are more than 350 million HBV carriers in the world, of whom roughly one million die annually from HBV-related liver disease.

The wide range in HBV carrier rate in different parts of the world is largely related to differences in the age at infection, which is inversely related to the risk of chronicity. Twenty to 50 percent for infections between the age of 1 and 5 years, and less than 5 percent for adult acquired infection.

Affordable measures, such as vaccination, safe blood supply, and safe injections, can reduce the transmission of viral hepatitis infections. Most of these measures not only reduce the transmission of viral hepatitis but also have spillover effects on the prevention of other infectious diseases.

The infection control practices recommended for hemodialysis units will reduce opportunities for patient-to-patient transmission of infectious agents, directly or indirectly via contaminated devices, equipment and supplies, environmental surfaces, or hands of personnel.

OBJECTIVES

To determine the immune status and response to HBV vaccination among pediatric hemodialysis patients following two different schedules.

METHODS

This is a prospective study done at Pediatrics Hemodialysis Unit, Children's Hospital, Ain Shams University starting in December 2012 till December 2014.

Patients:

The study included all patients with End Stage Renal Disease (ESRD) on regular hemodialysis in the Pediatric Dialysis Unit, Children Hospital, Ain Shams University. All 50 patients on regular hemodialysis in the unit (28 males and 22 females) were included. None of patients involved showed symptoms of hepatitis infection. Non-immune patients were divided randomly by Random Number Generator into two groups: Group1 (included 21 patients) which received recombinant HBV Vaccine at 0, 1 and 2 months and Group 2 (included 23 patients) which received the vaccine at 0, 1 and 6 months.

Methods:

1- Full history taking and complete physical examination.

2- Laboratory investigations:

Venous samples were withdrawn before hemodialysis session for all the patients under complete aseptic conditions to carry out the following:

Complete blood picture (blood withdrawn on EDTA-containing tube) by coulter method to demonstrate the total leukocyte count, hemoglobin and platelet count by Coulter method T cell counter.

A clotted venous sample for the assay of Liver function tests including; serum alanine aminotransferase (ALT), serum aspartate aminotransferase (AST), total and direct serum bilirubin (TSB, DSB), and serum albumin (Alb.) by Spikol eleven apparatus, Prothrombin Time (PT) by STA-Compact-CT apparatus, and Ferritin by Coulter CX9 apparatus.

HBsAg and HBsAb titre by ELISA technique.

Patients with HBsAb titre below 100IU/L were given the Recombinant HB vaccine (EU Vax B inj. Pediatric (100/5ml)), 1 ml for patients younger than 16 years old and 2 ml for patients older than 16 years old, given intramuscularly in a regimen of 3 double doses.

RESULTS

All 50 children on hemodialysis were included in the study, 28 were males (56%) and 22 were females (44%). Patients included had a mean age of 13.58 yrs., median of 14 (min-max = 5-24) with interquartile range of 6.

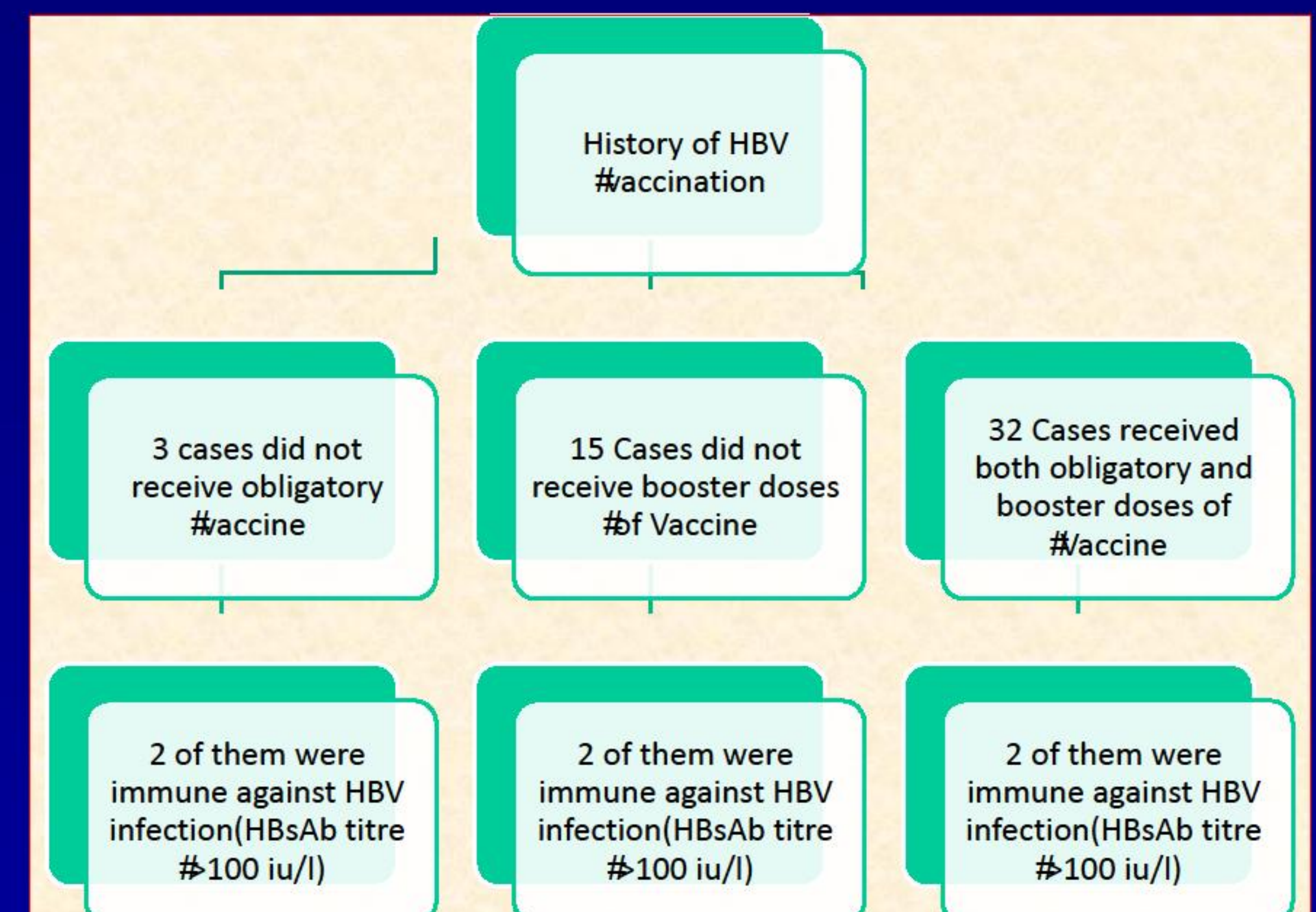


Figure (1): Algorithm showing history of HBV vaccination among the studied patients.

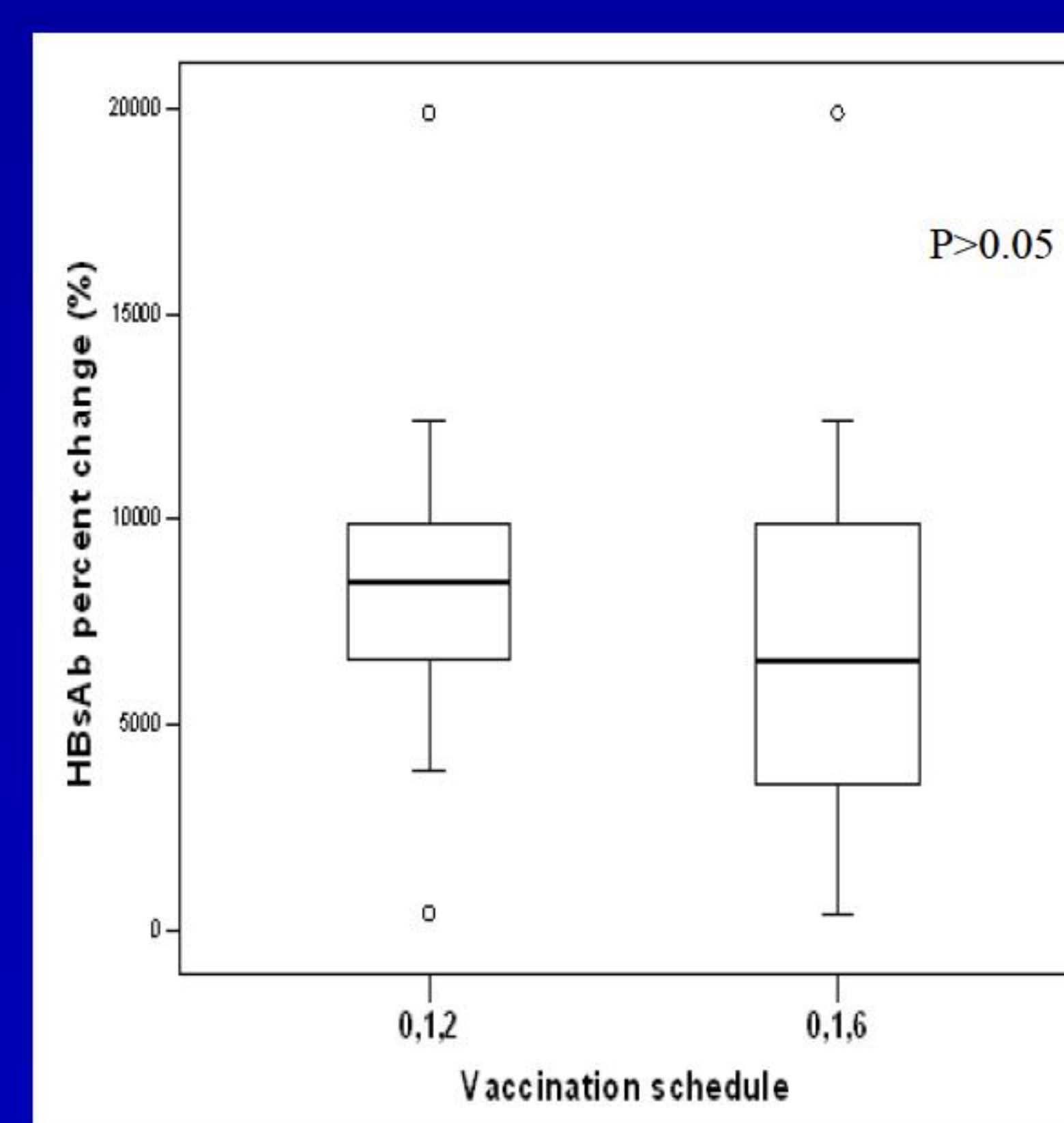


Figure (2): Shows comparison between the changes in antibody titre between the two groups underwent HBV vaccination.

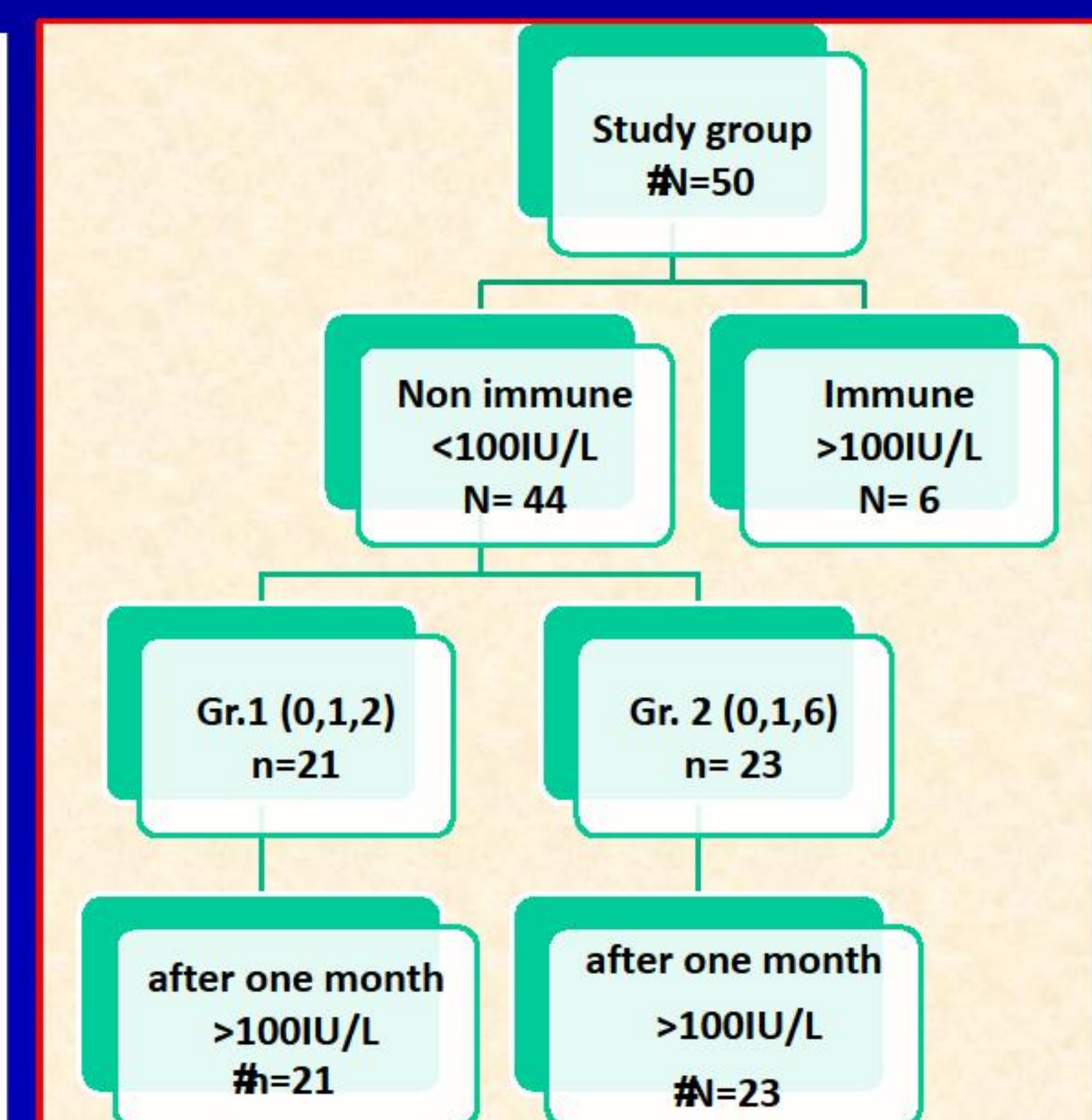


Figure (3): showing the immune status after 12 month of completion of the vaccine schedule at 0,1,2 and at 0,1,6 months.

Table (1): Comparison between studied groups regarding HBsAb titre following last dose vaccination by one month, 6 months and one year.

		group I	group II	T	Sig.
HBsAb after 1 month	mean±SD	968.4±137.6	742.1±362.8	2.55	0.01 (S)
	min-max	400- 1000	100 – 1000		
HBsAb after 6 month	mean±SD	755.3±356.3	865.8±154.6	0.54	0.59 (NS)
	min-max	100 – 1000	500 – 1000		
HBsAb after 1 year	mean±SD	875±154.6	810.5±200.4	1.13	0.27 (NS)
	min-max	500 – 1000	500 – 1000		

CONCLUSIONS

Patients on regular hemodialysis are at increased risk of acquiring HBV infections by several means. The prevalence of HBV was 0%. Adopting vaccination schedule using recombinant HBV vaccine in a regimen of 3 double doses, either in a schedule of 0, 1 and 2 months or 0, 1 and 6 months, proved to be effective in providing immune protection against HBV infection in all patients with no significant difference between both schedules.

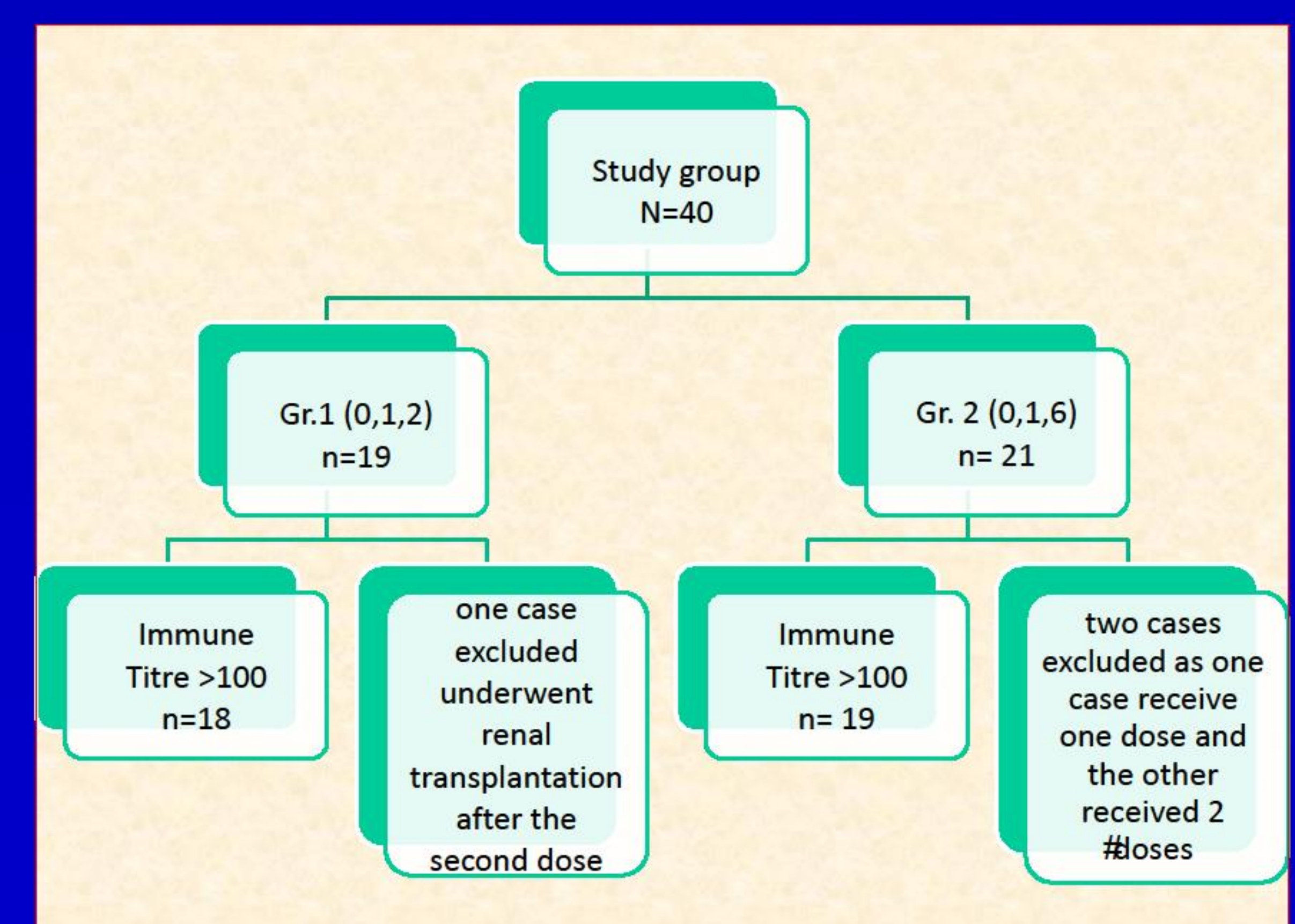


Figure (4): showing the immune status (HBs Ab titre) before vaccination and after 1 month of completion of the vaccine schedule in studied group.

FUNDING

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