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# Hepatitis B vaccination in patients on chronic haemodialysis: what are the factors that influence immune response? Ten years of experience with Engerix B® vaccine in our dialysis centre

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## INTRODUCTION

Despite universal infections control precautions, the prevalence of hepatitis B virus (HBV) infection remains high in patients on chronic haemodialysis (HD). For this reason, anti HBV vaccination is recommended by current guidelines in these subjects. Seroconversion rate after anti HBV vaccination in patients on chronic HD is usually lower than in healthy subjects ( 67-86% vs 90%) .
In our study we evaluated the factors that influenced the development of anti HBV immune response after vaccination in a cohort of patients on maintenance HD in our centre between 2003 and 2013.

## PATIENTS AND METHODS

• We retrospectively analysed 60 patients on chronic HD, 40 males and 20 females, immunized with Engerix B® vaccine 40 mcg i.m. for three doses and followed for a mean time of 62 months (range 12-120 months). Clinical and laboratory data are resumed in tab 1.

• Patients were divided in "high responders" (anti Hbs > 1000 IU/l), "good responders" (anti Hbs 100-1000 IU/l), "poor responders" (anti Hbs 10-100 IU/l) and "not responders" (anti Hbs < 10 IU/l).

• For each patient the following data were collected: **serum albumin (sAlb), pre HD blood urea nitrogen, age at vaccination, months on dialysis, presence of systemic diseases, type of vascular access, dialysis modality.**

• Correlation between these factors and anti Hbs titer was estimated with multiple regression analysis.

| | |
|---|---|
| Patients | 60 |
| Systemic diseases (SLE, hepatitis C, diabetes, calciphylaxis, peripheral vasculopathy, haematologic malignancies) or previous renal transplant | 20 |
| Mean title (IU/L) | 392 ± 439 |
| Mean age (years) | 64 ± 12 |
| Mean age at vaccination (years) | 58,8 ± 14 |
| Mean time on Haemodialysis (months) | 77 ± 68 |
| Type of vascular Access | 47 AVF<br>13 CVC/graft |
| Methodic | 13 high flux<br>47 low flux |
| Albumine (gr/dl) | 3,54 ± 0,4 |
| BUN pre HD (mg/dl) | 72 ±17 |

Tab 1

## RESULTS

- Mean age at the time of vaccination was 58,8 ±14 years. 58% of the subjects (35 patients) of the study were vaccinated before and 42% (25 patients) after starting haemodialysis. All patients had sAlb levels between 2,6 mg/dl and 4,5 mg/dl (mean sAlb 3,5 ± 0,4 mg/dl).

- Anti-Hbs seroconversion rate in our patients was **77%** (46 patients). "Not responders" were **23%** (14 patients).
  Among "responders" 17 patients (37%) were "high-responders", 14 patients (30,4%) were "good responders" and 15 patients (32,6%) were "poor responders" (fig 1).
  **The rate of "high responders" decreased with age** (fig 2)

- 12 responders patients needed repeated doses (maximum three doses) for loss of protective titer. Mean interval between administrations of additional doses was 26,9 months (range 5-60 months).

- **The better rate of seroconversion (86%) was observed in the group of patients with arteriovenous fistula vs CVC (43%), while a higher rate of "not responders" (50%) in the group of patients with systemic diseases.**
  Mean antibody titer did not differ between subjects vaccinated after or before starting HD or between subjects dialyzed with low flux or high flux membranes.

- **On multiple regression analysis the only parameter directly related to anti Hbs titer was sAlb (p=0,0012)**. sAlb was also inversely related to age in all patients (p=0,01).
  **In the responder group only age was related to anti Hbs titre (p=0,018)**. (Tab 2)

| | Serum albumine in all subjects | | Serum Albumine in Subjects with AVF | | Serum albumine Subjects with Sistemic diseases | | Age in Responders patients | |
|---|---|---|---|---|---|---|---|---|
| | P value | R partial | P value | R partial | P value | R partial | P value | R partial |
| Title | 0,0012 | 0,40 | 0,0038 | 0,41 | 0,02 | 0,43 | 0,018 | - 0,37 |
| Age | 0,01 | - 0,30 | 0,009 | - 0,38 | | | | |

Tab 2

## CONCLUSIONS

In our population of patients on maintenance HD serum albumin, young age and arteriovenous fistula as vascular access, generally markers of good clinical conditions, were significantly correlated with an effective immune response after anti HBV vaccination.
Factors such as time on dialysis before vaccination or dialysis modality did not influence the immune response.

**Therefore, in patients on chronic HD, early vaccination is mandatory in order to obtain a better protection against HBV infection.**

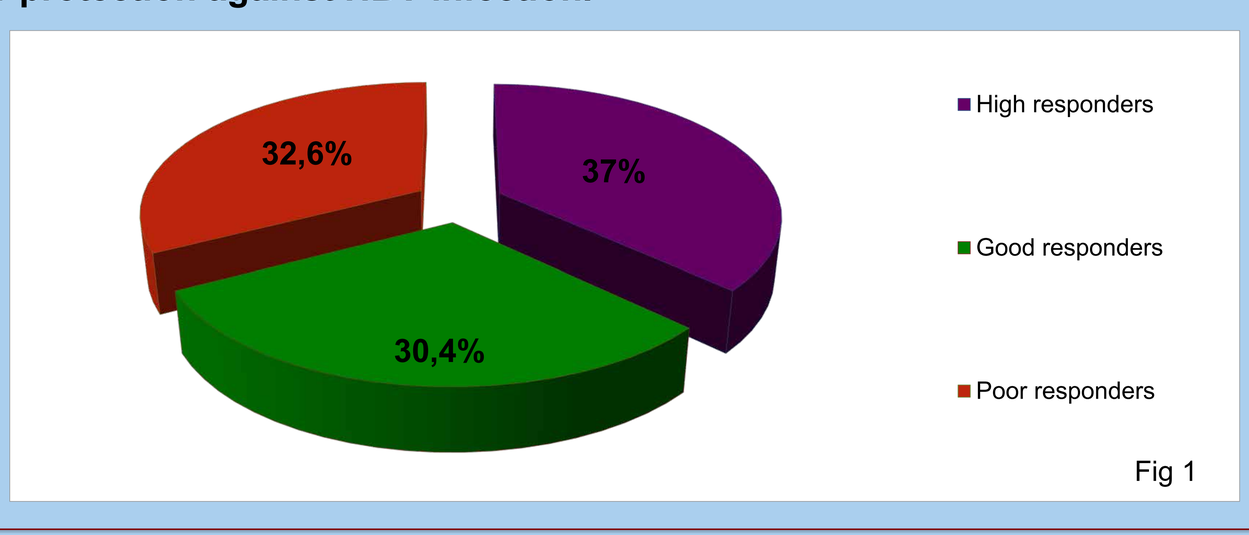


Fig 1

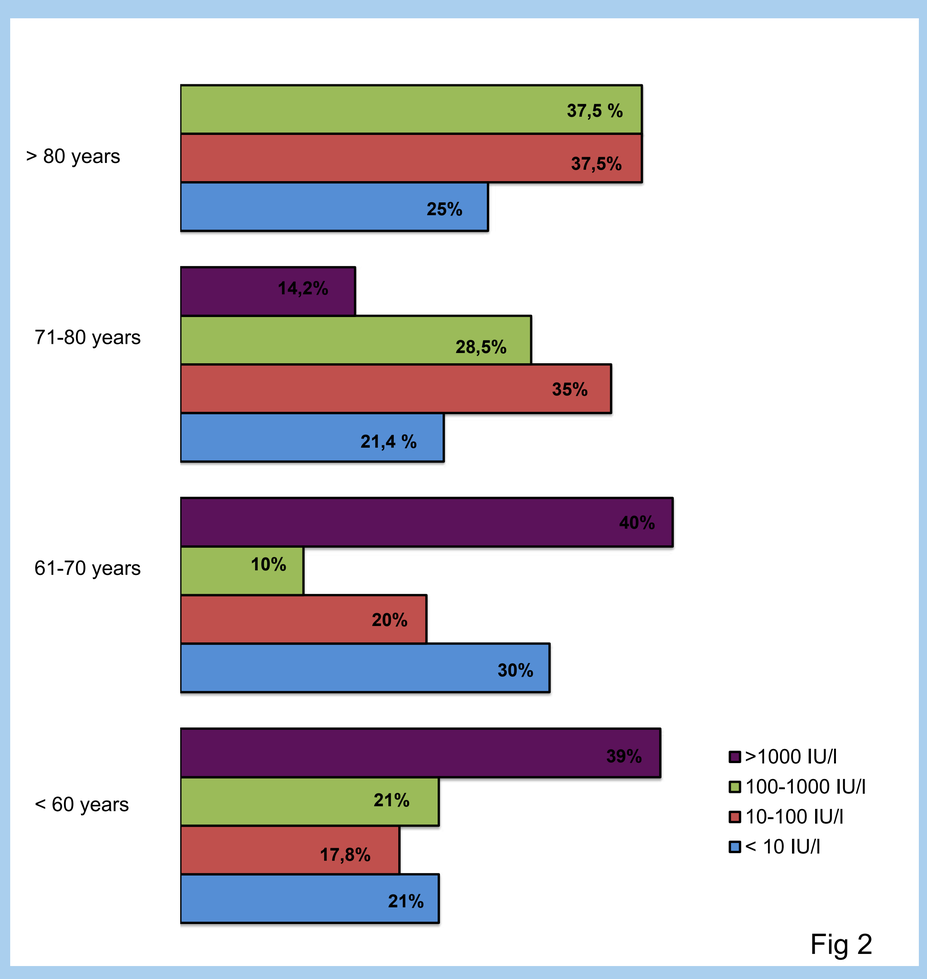


Fig 2

**On this topic**

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