

# PREVENTION OF HEPATITIS B BY VACCINATION AND IMMUNE RESPONSE ACCORDING TO THE SCHEME ADOPTED IN IMMUNOSUPPRESSED PATIENTS VACCINATION UNIT SEMEP EHUO 2013-2017

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## **Abstract**

***The work consists of a retrospective descriptive study on the files of immunocompromised vaccinated against hepatitis B in the vaccination unit from 2013 to 2017. The file contains the personal characteristics of the patient, the serology before and after the vaccination by the adopted scheme. Four schemes are indicated: the standard, the standard double-dose regimen, the accelerated regimen and the regimen reinforced with 4 double-dose injections. Anti-Hbs antibodies are titrated four to eight weeks after the last dose. The objective of the study is to identify the type of immune response in this population and to study the type of association.***

***468 immunocompromised patients are registered with a sex ratio of 0.5. Chronic renal failure represents more than 57% of all immunocompromised patients with 271 cases. Crohn's disease, with 120 cases (25.6%), comes second, followed by liver disease. The standard diet is indicated in 126 (27%) patients. 238 cases (51%) benefited from a standard double dose regimen. The reinforced regimen with 4 double dose injections is indicated in 19% of cases. An antibody level higher than 10 IU is recorded in 16.3%. The response is greater than 100 IU in 66% of the cases. The study of the association between the type of scheme and the pathology seems very significant ( $\chi^2 = 270$   $p =$***

***0.000) as well as for the association between the type of scheme and the immune response.***

***Keyword: Immunocompromised, vaccination, hepatitis B, immune response, Oran, EHUO.***

## **1.INTRODUCTION**

Prevention of the risk of infection in immunocompromised persons is generally ensured by vaccination, the effectiveness of which is conditioned by the nature and intensity of the immunosuppression. There are two types of immune deficiency: hereditary or secondary (1,2). The vaccination unit at the level of the epidemiology and preventive medicine service takes care of all immunocompromised patients requiring vaccination against hepatitis B. They are oriented by all the hospital services. These are patients followed mainly for chronic renal failure (CKD), Crohn's disease, liver disease or kidney transplantation. The vaccination schedule is indicated depending on the patient's pathology and serological status. The objective of the study is to identify the type of immune response of immunocompromised vaccinated against hepatitis B and look for an association between the type of regimen indicated and other factors.

## **2. PATIENTS AND WORKING METHOD**

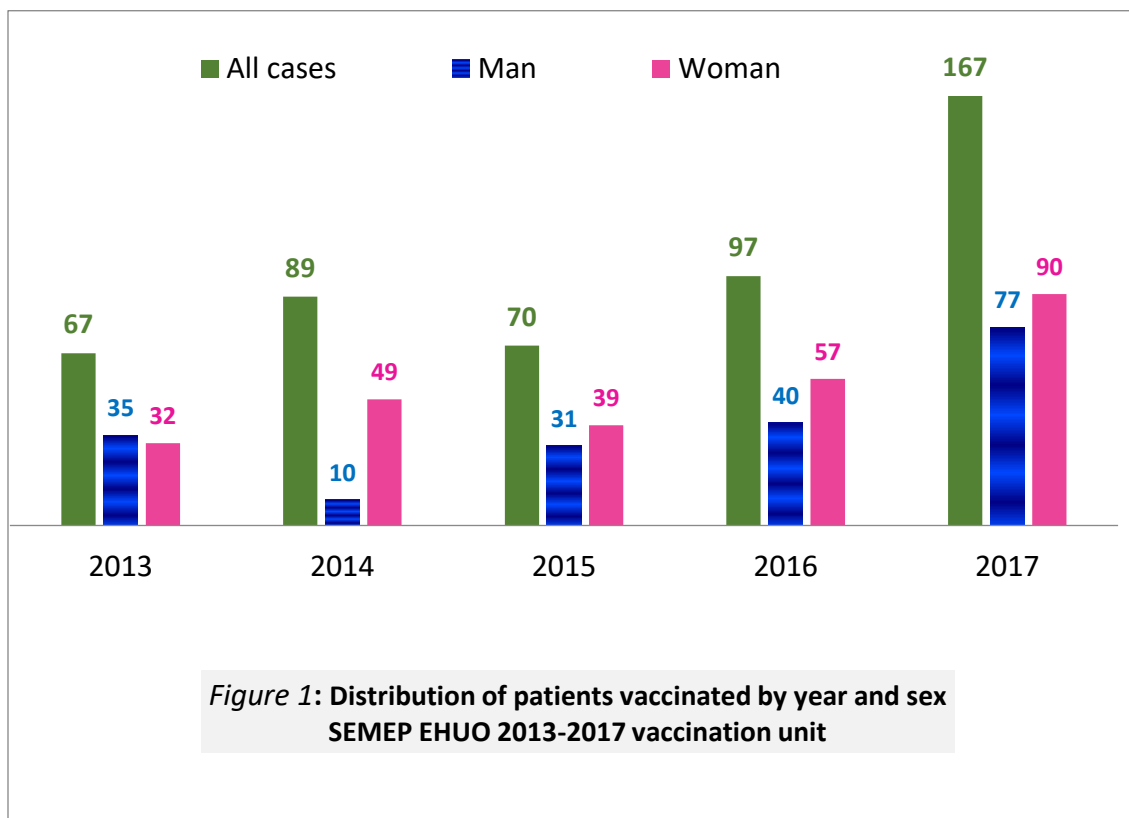
The study is a retrospective description of all the immunocompromised cases managed at the vaccination unit from 2013 to 2017.

The patient's follow-up sheet is established at first contact. She includes the patient's personal characteristics, the serology before vaccination (HBs antigens and anti HBs antibodies and anti HBc antibodies), the indicated schedule. Four types of scheme is indicated (3,4) : the standard regimen, the

standard double-dose regimen, the accelerated regimen, and the reinforced 4-injection regimen with double dose. Anti-Hbs antibodies are titrated four to eight weeks after the last dose to identify the immune response.

Data entry and processing is carried out using Epi-info 6 software.

### 3. RESULTS



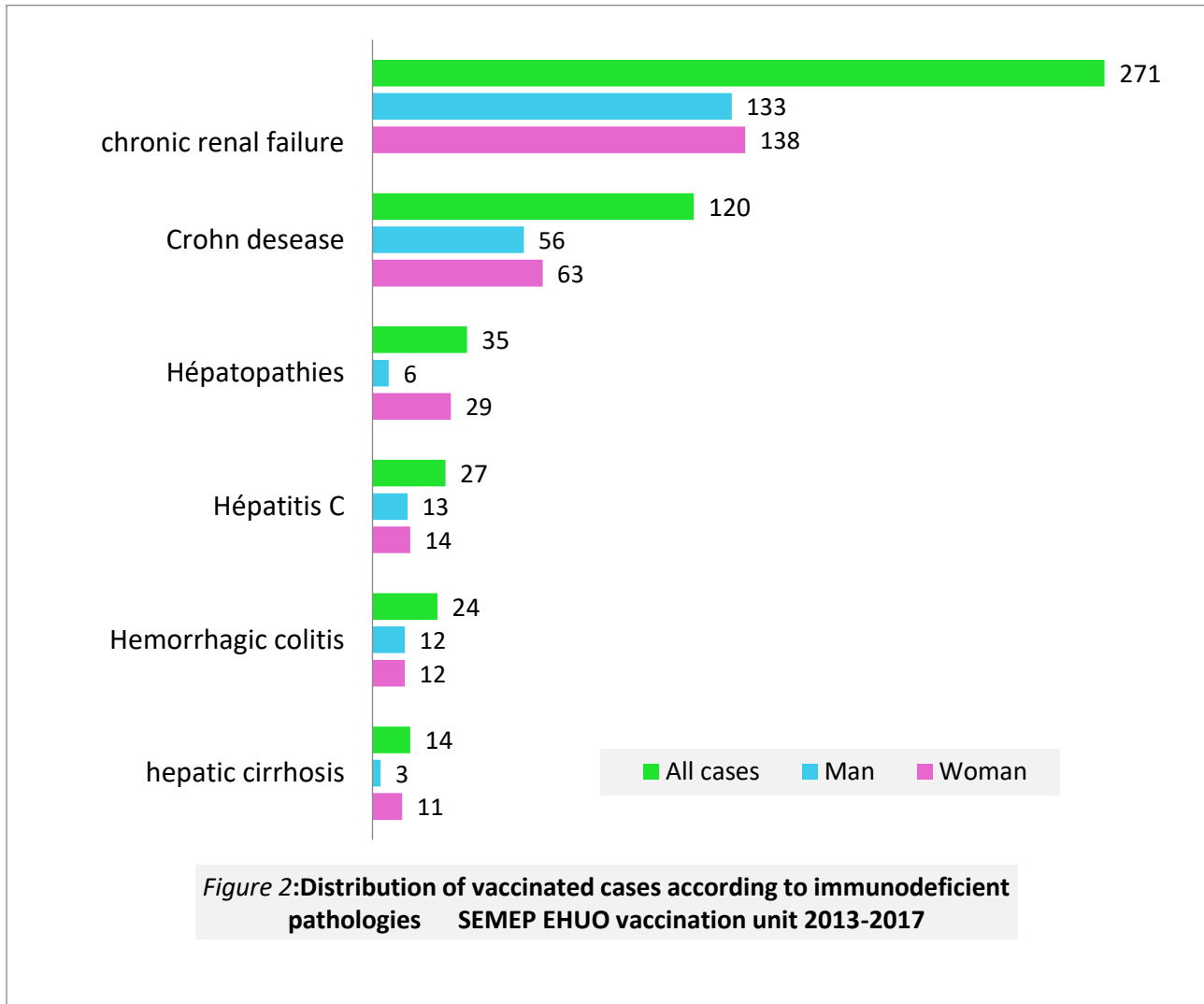


Tableau 1

### Characteristics for the age in immunocompromised patients

Age	Man	Woman	Total
Middle age	49±1.4	48,5±2	48.9±1.5
Mode	46	57	45
Total	223 (45.5%)	267 (54.4%)	490 (100%)

### The different types of vaccination scheme used

Cases (%)

Schema type	Men	Women	Total
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Standard	49 (23.6)	77 (29.7)	126 (27)
Standard with double dose	117 (56.3)	121 (46.7)	238 (51)
Accelerated scheme	4 (1.9)	10 (3.9)	14 (3)
Intensified double dose regimen	38 (18.3)	51 (19.7)	89 (19)

#### Types of immune response

#### Cases (%)

Immune response	Men	Women	Total
<10 IU	15 (16)	22 (19)	37 (17.7)
10-100 IU	13 (14)	21 (18.1)	34 (16.3)
>100 IU	65 (60)	73 (62.9)	138 (66)

#### Type of association

Between the type of pattern and the disease	$\chi^2=118.7$ <b>p=0.000</b>	$\chi^2=163.7$ <b>p=0.000</b>	$\chi^2=270.00$ <b>p=0.000</b>
Between the type of regimen and the immune response	$\chi^2=276.3$ <b>p=0.000</b>	$\chi^2=431.3$ <b>p=0.000</b>	$\chi^2=680.0$ <b>p=0.000</b>

## 4. DISCUSSION

Out of 702 patients registered during the study period, 468 (66.7%) are immunosuppressed. A lack of

information was identified in the files, in particular with regard to post-vaccination serology to study the immune response. Thus, our study focused only on the monitoring sheets. Of these, 254 (54.7%) are women with a sex ratio of 0.5. This explains the frequency of the female sex in the working group. The largest number, 167 cases, was recorded in 2017 (figure 1).

The distribution of registered cases is dominated by chronic renal failure which represents more than 57% of all immunocompromised with 271 cases. An equal frequency is recorded in both sexes (Figure 2). The chronic renal failure is the most common chronic kidney disease (5). Patients with chronic renal failure and in

particular hemodialysis patients (HD) are exposed to a dysfunction of the immune system

making them more susceptible to infections due to their exposure to blood products []. It is therefore necessary to adapt the dosing schedule for vaccines in the CKD patient. This immune dysfunction results in a decrease in the rate of seroconversion and the rate of antibodies. There is also a more rapid decrease in antibody levels over time compared to healthy subjects [2].

Crohn's disease, with 120 cases (25.6%), ranks second. These are cases referred by the gastroenterology department. In third position come all types of liver disease with 39 cases (8.3%); they are more common in women. The hepatitis C has also been reported; they number 37 and are followed by ulcerative colitis with 24 cases. Cirrhosis is the last pathology found in the distribution (figure 2).

Regarding the type of scheme adopted, the standard scheme is indicated in 126 (27%) patients. 238 cases

(51%) benefited from a standard double dose regimen. The reinforced regimen with 4 injections with double dose is indicated in 19% of the cases, ie 89 patients. The accelerated schedule was reserved for 14 patients who are mostly hospital staff who presented to the unit following a health care exposure accident.

The 17.7% (37 patients) vaccinated did not respond to the hepatitis B vaccine. They are non-responders to the vaccine. On the other hand, an antibody level higher than 10 IU is recorded in 34 cases (16.3%). The response is greater than 100 IU in 66% of the cases, i.e. 60% in men and 62.9% in women. The search for an association between the type of scheme and the pathology seems very significant ( $\chi^2 = 270$   $p = 0.000$ ) as well as for the association between the type of scheme and the immune response, it seems very significant. The vaccination scheme, with its modalities, appears to give a good immune response or good coverage for immunocompromised patients who are at risk for infection with the hepatitis B virus (table 1).

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#### 4. CONCLUSION

Vaccination is one of the prophylactic measures available and is essential in immunocompromised patients. Chronic kidney disease is common and is the most common chronic kidney disease. It is associated with a decrease in the immune response. Patients with kidney failure often have other conditions such as diabetes and cardiovascular disease. Therefore, any infectious event is at risk of worsening kidney failure at any stage. It is recommended that these patients receive, in addition to vaccinations from the vaccination

schedule (diphtheria, tetanus, polio, whooping cough, etc.), vaccination against influenza and anti-pneumococcus. The Hbs vaccine is an effective means of preventing hepatitis B. The use of a scheme adapted according to the disease and the patient's status appears to improve the immune response in immunocompromised patients.

It is therefore essential that the healthcare professional knows the recommendations for vaccination in these at-risk populations to ensure better protection (3-6).

Immunization of those around them is also an essential measure to protect these patients.

#### BIBLIOGRAPHIC REFERENCES

- [1] Haute Autorité de santé (HAS) : Guide de parcours de soins : Maladie rénale chronique de l'adulte - février 2012.
- [2] Bruno Moulin et Marie-Noëlle Peraldi (Professeurs de Néphrologie). Néphrologie : Collège universitaire des enseignants -7ème édition « Réussir l'ECN » 2016.
- [3] F.Zerdoumi et al. Etude du profil épidémiologique des néphropathies glomérulaires; expérience du service de Néphrologie du CHU Bab El Oued Alger.CA - XVI Congrès Maghrébin 2018.
- [4] Nicolas Janus, Sabine Amet, Sarah Rapuch-Zimmer, Gilbert Deray, Vincent Launay-Vacher. Vaccination and chronic kidney disease, *J Pharm Clin* 2010 ; 29 (3) : 149-57
- [5] Bénédicte Stengel
- [6] Chronic renal failure: An epidemic? The medical press - Volume 40, Issue 11, November 2011, Pages 1020-1027
- [7] Ernest K.Sumaili, Jean-MarieKrzyszinski, Eric P.CohencNazaire, M.Nseka
- [8] Epidemiology of chronic kidney disease in the Democratic Republic of Congo: Review of cross-sectional studies from Kinshasa, the capital
- [9] Nephrology and therapy - Volume 6, Issue 4, July 2010, Pages 232-239